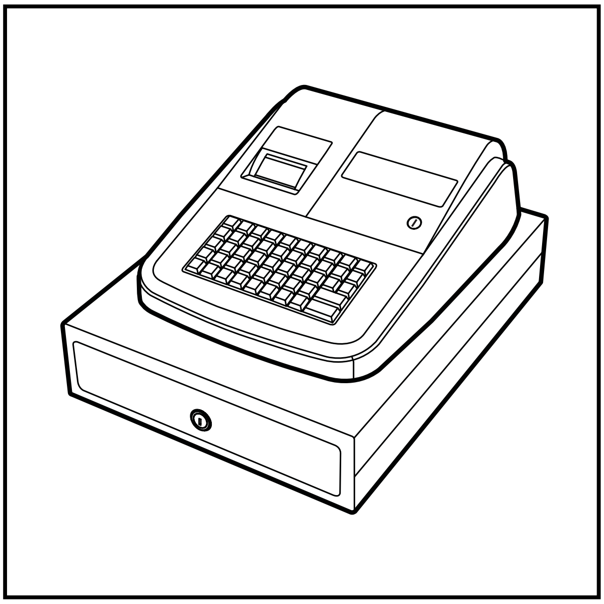
SAM4S

ELECTRONIC CASH REGISTER

ER-180T SERIES

SERVICE *Manual*

ELECTRONIC CASH REGISTER



CONTENTS

About this Manual

This service manual describes how to perform hardware service maintenance for the SAM4S ER-180T Series Electronic Cash Register.

Notes

Notes may appear anywhere in the manual. They describe additional information about the item.

Precaution symbols

⚠. Indicates a Safety Precaution that applies to this part component.

⚠. Indicates the part or component is an electro-statically sensitive device. Use caution when handling these parts.

SAM4S ER-180T SERIES

Service Manual First edition.

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V1.0

Printed in KOREA

Overview of this ECR

This ECR is a microprocessor-based system, using an 8 bits microprocessor.

This service manual provides the technical information for many individual component systems, circuits and gives an analysis of the operations performed by the circuits. If you need more technical information, please contact our service branch or R&D center. Schematics and specifications provide the needed information for the accurate troubleshooting.

Note: Before using this Electronic Cash Register (ECR) for the first time, leave it powered on in the REG mode for at least 24 hours. This allows the MS Lithium battery, which maintains the memory of the ECR while the power is off, to charge completely.

"Proper disposal of batteries is required. Refer to your local codes for disposal requirements."

1 Precaution Statements

Follow these safety, servicing and ESD precautions to prevent damage and to protect against potential hazards such as electrical shock.

1-1 Safety Precautions

1. Be sure that all built-in protective devices are replaced. Restore any missing protective shields.
2. When reinstalling the chassis and its assemblies, be sure to restore all protective devices, including nonmetallic control knobs and compartment covers.
3. Make sure there are no cabinet openings through which people - particularly children - might insert fingers and contact dangerous voltages.
   Such openings include excessively wide cabinet ventilation slots and improperly fitted covers and drawers.
4. Design Alteration Warning:
   Never alter or add to the mechanical or electrical design of the ECR. Unauthorized alterations might create a safety hazard. Also, any design changes or additions will void the manufacturer's warranty.
5. Components, parts and wiring that appear to have overheated or that are otherwise damaged should be replaced with parts that meet the original specifications. Always determine the cause of damage or over- heating, and correct any potential hazards.
6. Observe the original lead dress, especially near the following areas: sharp edges, and especially the AC and high voltage supplies.
   Always inspect for pinched, out-of-place, or frayed wiring. Do not change the spacing between components and the printed circuit board. Check the AC/DC adaptor for damage. Make sure that leads and components do not touch thermally hot parts.
7. Product Safety Notice:
   Some electrical and mechanical parts have special safety-related characteristics which might not be obvious from visual inspection. These safety features and the protection they give might be lost if the replacement component differs from the original - even if the replacement is rated for higher voltage, wattage, etc.

   Components that are critical for safety are indicated in the circuit diagram by shading, (⚠) or (⚠). Use replacement components that have the same ratings, especially for flame resistance and dielectric strength specifications. A replacement part that does not have the same safety characteristics as the original might create shock, fire or other hazards.

CAUTION

Danger of explosion if battery is incorrectly replaced.

Replace only with the same or equivalent type recommended by the manufacturer.

Dispose used batteries according to the manufacturer's instructions.

ATTENTION

Il y a danger d'explosion s'il y a remplacement incorrect de la batterie.

Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le constructeur.

Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

1-2 Servicing Precautions

WARNING: First read the-Safety Precautions-section of this manual. If some unforeseen circumstance creates a conflict between the servicing and safety precautions, always follow the safety precautions.
WARNING: An electrolytic capacitor installed with the wrong polarity might explode.

1. Servicing precautions are printed on the cabinet. Follow them.
2. Always unplug the units AC/DC adaptor from the AC power source before attempting to:
   (a) Remove or reinstall any component or assembly
   (b) Disconnect an electrical plug or connector
   (c) Connect a test component in parallel with an electrolytic capacitor
3. Some components are raised above the printed circuit board for safety. An insulation tube or tape is sometimes used. The internal wiring is sometimes clamped to prevent contact with thermally hot components. Reinstall all such elements to their original position.
4. After servicing, always check that the screws, components and wiring have been correctly reinstalled. Make sure that the portion around the serviced part has not been damaged.
5. Always connect an instrument's ground lead to the instrument chassis ground before connecting the positive lead ;
   Always remove the instrument's ground lead last.

1-3 Precautions for Electrostatic Sensitive Devices (ESDs)

1. Some semiconductor (solid state) devices are easily damaged by static electricity. Such components are called Electrostatic Sensitive Devices (ESDs); examples include integrated circuits and some field-effect transistors. The following techniques will reduce the occurrence of component damage caused by static electricity.
2. Immediately before handling any semiconductor components or assemblies, drain the electrostatic charge from your body by touching a known earth ground. Alternatively, wear a discharging wrist-strap device. (Be sure to remove it prior to applying power - this is an electric shock precaution.)
3. After removing an ESD-equipped assembly, place it on a conductive surface such as aluminum foil to prevent accumulation of electrostatic charge.
4. Do not use freon-propelled chemicals. These can generate electrical charges that damage ESDs.
5. Use only a grounded-tip soldering iron when soldering or unsoldering ESDs.
6. Use only an anti-static solder removal device. Many solder removal devices are not rated as anti-static; these can accumulate sufficient electrical charge to damage ESDs.
7. Do not remove a replacement ESD from its protective package until you are ready to install it. Most replacement ESDs are packaged with leads that are electrically shorted together by conductive foam, aluminum foil or other conductive materials.
8. Immediately before removing the protective material from the leads of a replacement ESD, touch the protective material to the chassis or circuit assembly into which the device will be installed.
9. Minimize body motions when handling unpackaged replacement ESDs. Motions such as brushing clothes together or lifting a foot from a carpeted floor can generate enough static electricity to damage an ESD.

2 Product Specifications

Specifications are correct at the time of printing. Product specifications are subject to change without notice. See below for product specifications.

2-1 General Specification

A. System Specifications

Item	Description	Remark
Processor	• RENESAS CPU M3030RF (16-Bit)	
Memory	• DATA SRAM : 128KBytes (External) • PGM FLASH : 128KBytes (CPU internal)	
Battery	• Type : MS Lithium, 3.0V 11mAh • Part Name : MS920S • Charging Time : 24 Hours • Life : 3 Years	Rechargeable
Data Storage	• 90 Days	When battery is fully charged
Printer	• Model : LTPZ225 (SII) • Print Speed : 30 mm/sec (7.7 Line/sec) • Type : Thermal dot line printing type	Detail Spec refers to next page
Display	• Operator Display : 8 Digits LED • Customer Display : 8 Digits LED #Option	
Keyboard	• Max. 48 Keys Raised-I (w/o cap) • Max. 48 Keys Raised-II (with cap) #Option	
Drawer	• B-type (3B4C, 4B4C) • Bplus-type (3B4C, 4B4C) #Option • G-type (5B5C, 4B8C, 5B8C) #Option • Compulsory s/w #Option	
Consumption	• Max. : 11W Reg. : 7W	
Power Requirement	• Adaptor DC7V/2A (Input : AC 90~260V / 50~60Hz)	
Environment Condition	• Temperature : 0℃ ~ 45℃ • humidity : 30% ~ 80% RH	
Dimensions(mm)	• 420(L) X 325(W) X 202(H) • 450(L) X 400(W) X 218(H)	With B-Drawer & Bplus Drawer With G-Drawer (Option)
Weight	• 3.8Kg (SET only) • 8.1Kg (SET only)	With B-Drawer & Bplus Drawer With G-Drawer (Option)

Table2-1 General Specifications

2-1 General Specification

B. Printer Specification

Item		Description	Remark
Model		• LTPZ225 (SII)	
Print Method		• Thermal Direct Line Printing	
Printing Format	Total Number of Dots	• 192 Dots	
	Dot Pitch	• Vertical : 0.25 mm • Horizontal : 0.25 mm	
Printing Speed		• 30mm/Sec (7.7Line/Sec)	
Printing Direction		• Unidirectional friction feed	
Paper Feeding	Feeding Method	• Friction Feed	
	Minimum Feed Pitch	• 0.125 mm	
	Feeding Speed	• 30 mm/Sec	
Power Supply Volt	Power Voltage	• 6.5V	Head/Motor
	Circuit Input Voltage	• 5V	Head Control/Sensor
Printer Head	Heat Element Density	• 4 Dots/mm (100 dpi)	
	Total Head Elements	• 192 Dots/Dot Line	
	Available Printing Width	• 48 mm	
Line Feed Motor		• 4-Phase Bi-Polar Stepping Motor	
Sensor	Head Temperature	• Thermistor	
	Paper-End Sensor	• Mechanical Switch Sensor	
Reliability	Life	• 10km / 5×10^7 pulse	
Dimension (mm)		• 69.8 (W) ×33.0 (D) ×16.0 (H)	
Weight		• Approx. 45 g	

Table2-2 Thermal Printer Specification

C. Paper Specification

Item	Description	Remark
Paper Type	• Single-ply Thermal Paper Roll	
Paper Size	• 1 station 57.5 ±0.5 mm (Width) × diameter Ø 80 mm or less	
Specified Paper	• Original Paper No : HPK-110 (Hansol paper XT)	

Table2-3 Paper Specifications

Note: The following paper can be used instead of the specified paper above.
TF50KS-E: Nippon paper industries Co.,Ltd.
PD 160R : New Oji paper Mfg, Co.,Ltd. , F380 : Kansaki specialty papers, Inc. (USA)

D. Character Specification

Item	Description	Remark
Character Structure	• 8(W) × 12(H) Font (Including a horizontal)	
Character Size	• 1.5 mm(W) ×3.0 mm(H)	
Column Pitch	• 2.0 mm	
Line Pitch	• 3.875 mm (Including 3.5-dot line spacing)	
Number of Column	• 16 (8×12 Dots/Character)	

Table2-4 Character Specification

2-2 Appearance

A. Appearance Dimensions (mm)

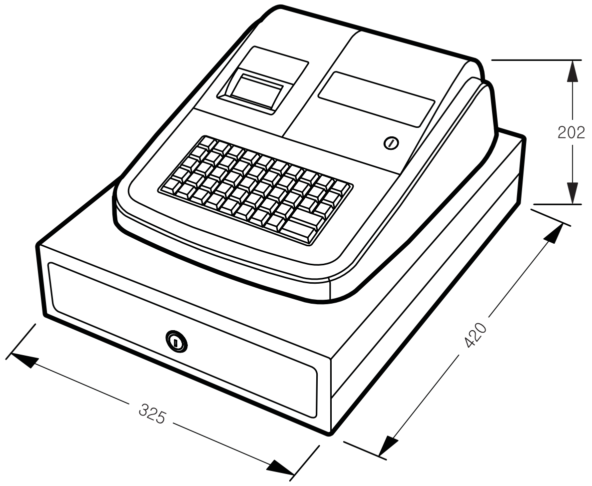
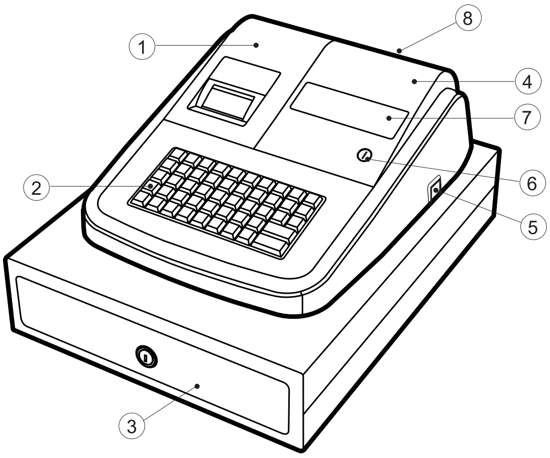


Figure2-1 Dimensions

B. ECR Features



① Cover Printer
② Key Board
③ Cash Drawer
④ Cover Display
⑤ Power Jack
⑥ Mode Switch
⑦ Front Display
⑧ Rear Display(Option)

Figure2-2 Location Feature

Memo

3 Installation and Operation

WARNING: Before using Electronic Cash Register (ECR) for the first time, leave it powered ON in the REG mode for *at least 24 hours.* This allows the MS-Lithium battery, which maintains the ECR's memory while the power is OFF, to charge fully.

3-1 Installation

3-1-1. Paper Roll Installation and Take-Up Spool Installation

1. Remove the printer cover.(Fig 3-1 (A),(B))
2. Open the housing clam cover and Insert the paper roll as shown.(Fig 3-1 (C), (D))
3. Pressing the housing clam cover.(Fig 3-1 (E))
4. Lay a cover on the side and press the FEED button.
5. Feed the leading edge of the paper in about 150mm and fold the tip in 20mm.
   Insert the leading edge of the paper into the slot on the Spool Winding. (Fig 3-1 (F),(G))
6. Turn the Spool Winding in 2~3 turns. (Fig 3-1 (H))
7. Place the Spool Winding on the Paper Supply. If it loosen, turn to tighten it. (Fig 3-1 (I))
8. Replace the printer cover.(Fig 3-1 (J))

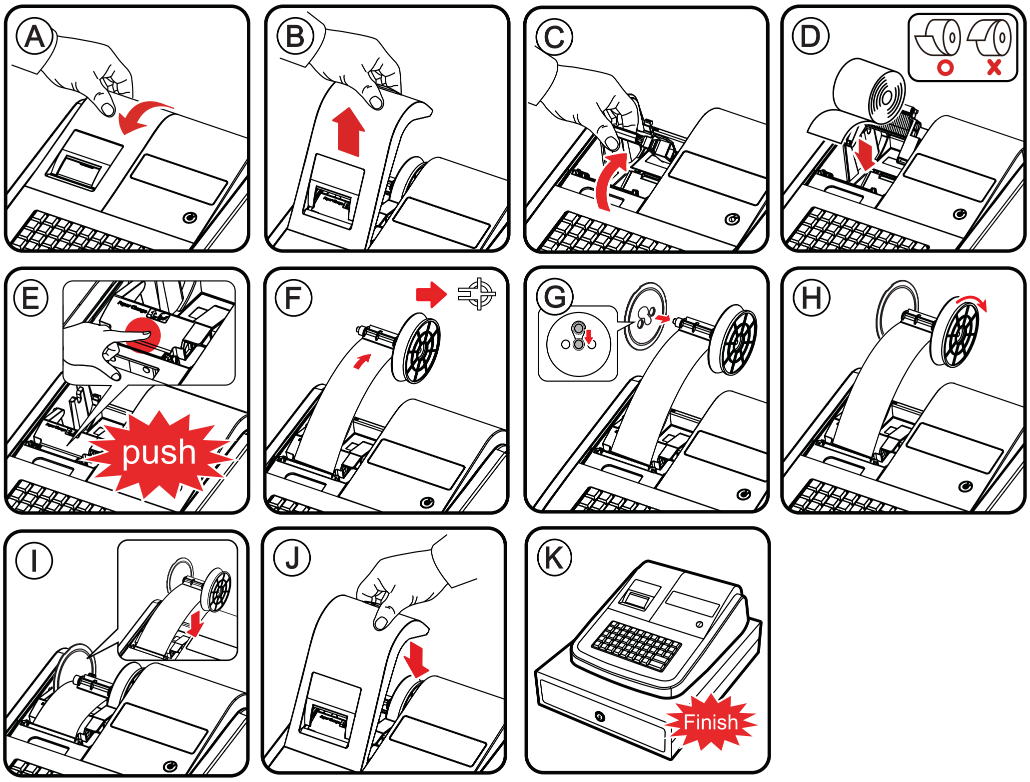
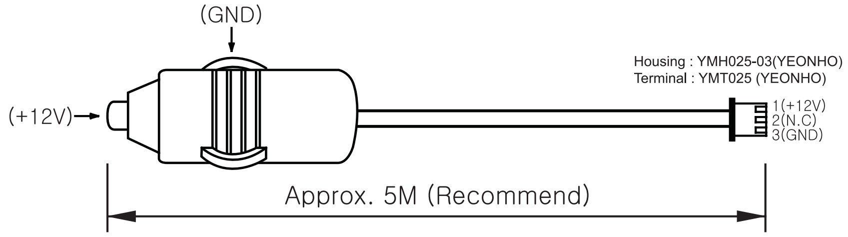
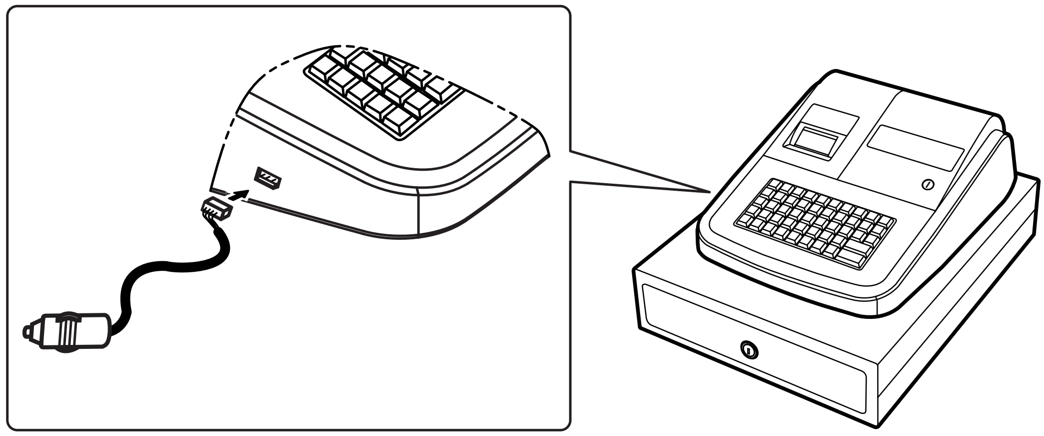


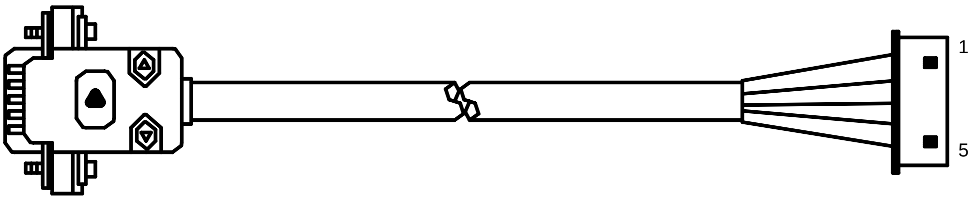
Figure 3-1. Paper Installation and Take-Up Spool Installation

3-1-2. Cigar-Jack Power Installation

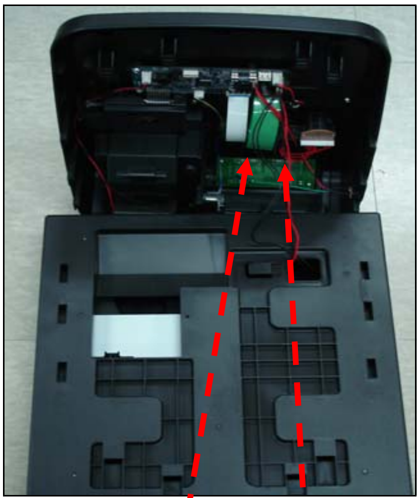
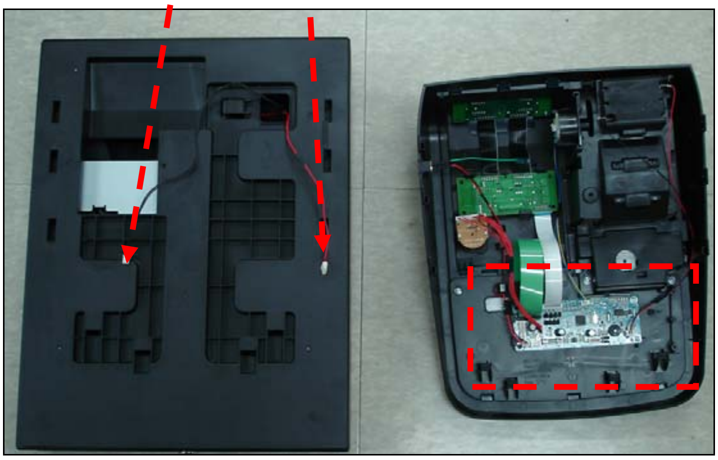
Warning: Only use Cigar-Jack Power. Do not connect AC Power Cord.

No	Description
1	**1. Use the Cigar Jack cable.**  **(CIGAR JACK CABLE)**
2	1. Insert the CIGAR JACK CABLE like below figure. 2. Connect the 3 Pin connector of the CIGAR JACK CABLE for a Vehicle Battery. 

3-1-3. Program Download

No	Description
1	**DOWNLOAD CABLE** for Program Update. (Special Cable for ER-180/180T)  **(DOWNLOAD CABLE)**
2	– Disassemble the cover printer 
3	– Disassemble the screw. 

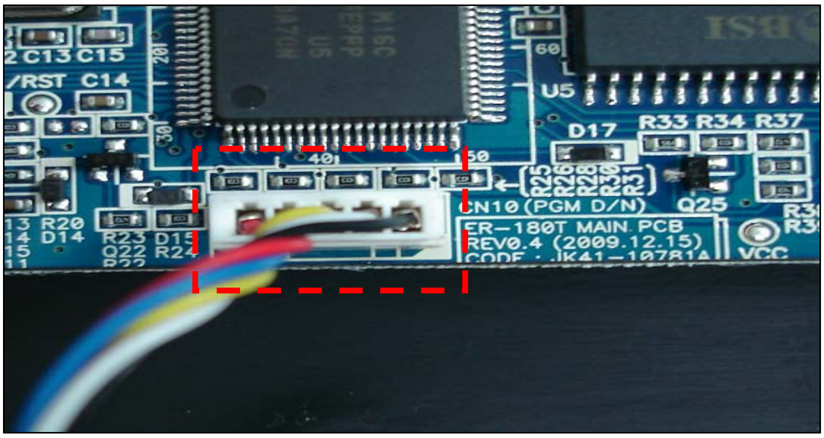
3-1-3. Program Download

No	Description
4	– Disassemble the drawer.  – Disconnect the drawer harness and compulsory harness. Disassemble the drawer. 

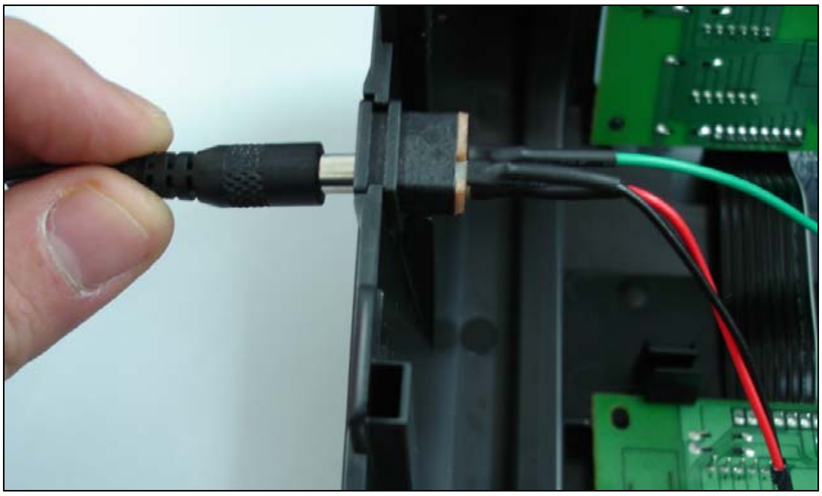
3-1-3. Program Download

<table>
<tr><th>No</th><th>Description</th></tr>
<tr><td>5</td><td>

– Insert the download cable.

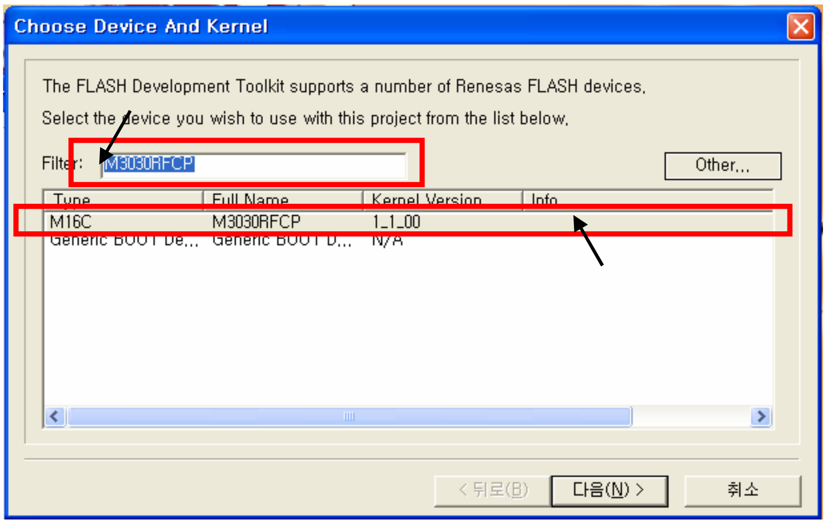
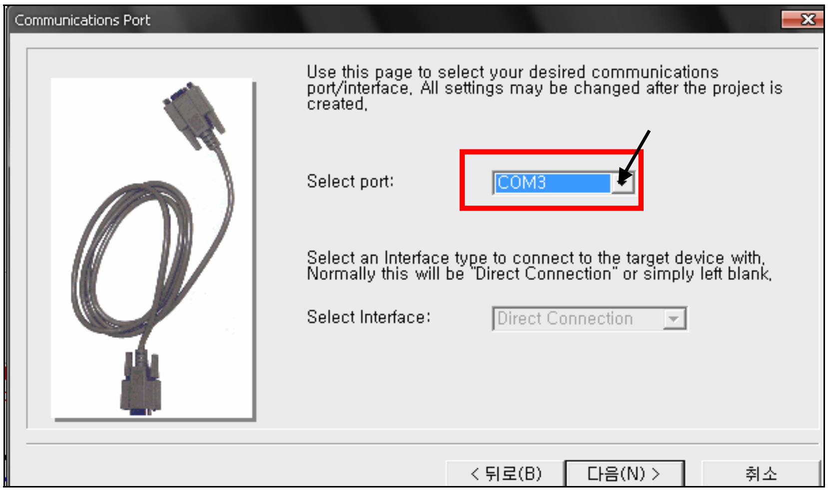


– Insert the DC power cord.



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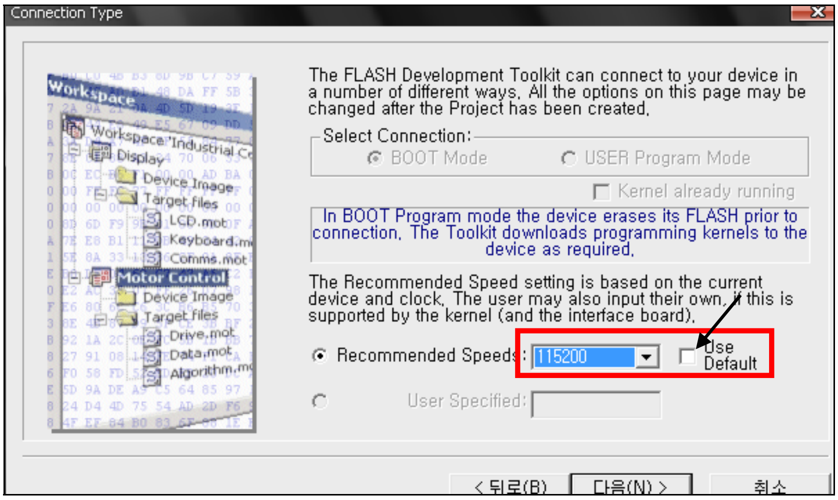
3-1-3. Program Download

No	Description
6	– Install and Run the Flash Development Took Kit V4.05 program. During installation, choose all setting options as default value. – Run the Flash Development Tool Kit Basic. (You should install this program first) – Type “M3030RFCP” in the Filter Edit box and select ‘M16C _M3030RFCP’ and press “Next” button.  – Select connected port of your PC and press “Next button”. 

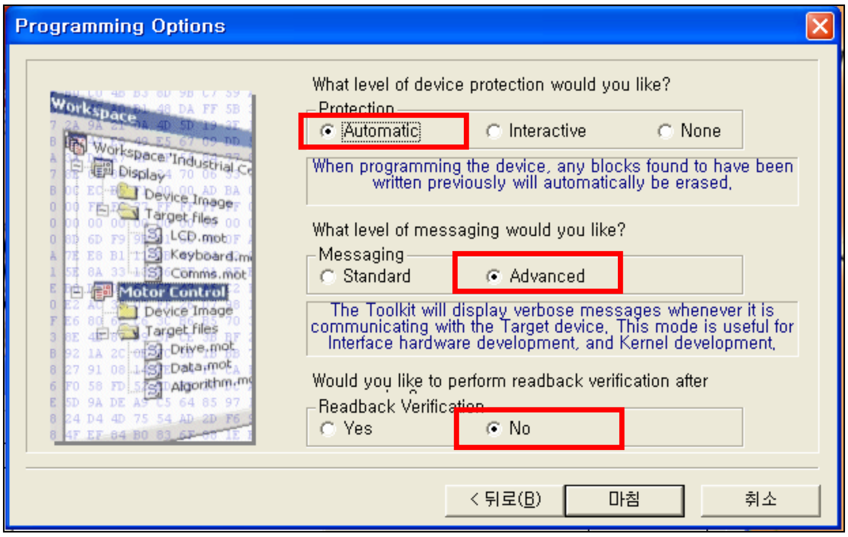
3-1-3. Program Download

<table>
<tr><th>No</th><th>Description</th></tr>
<tr><td>7</td><td>

– select communication speed. Uncheck “Use default” and set “115200” to the “Recommended speeds” and press “Next button”.



– Press “Finish”button.

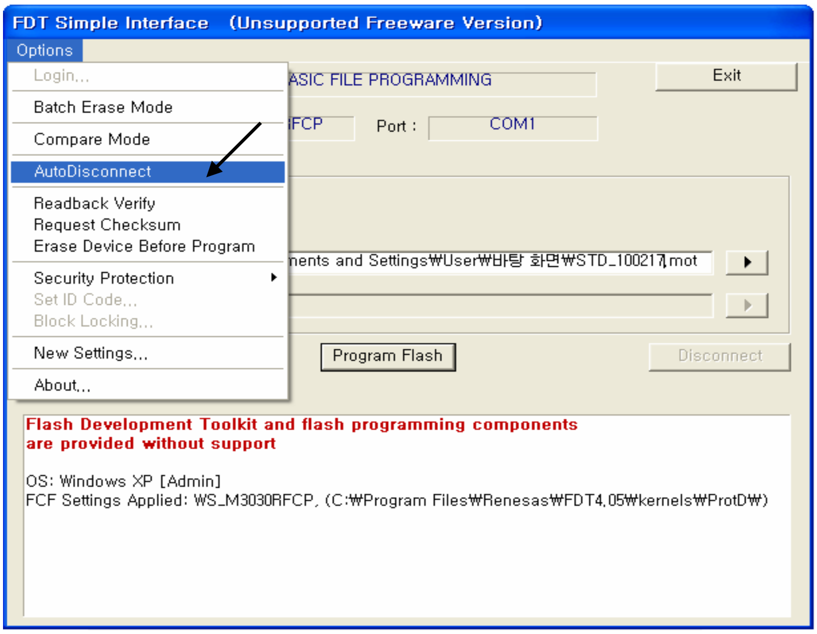


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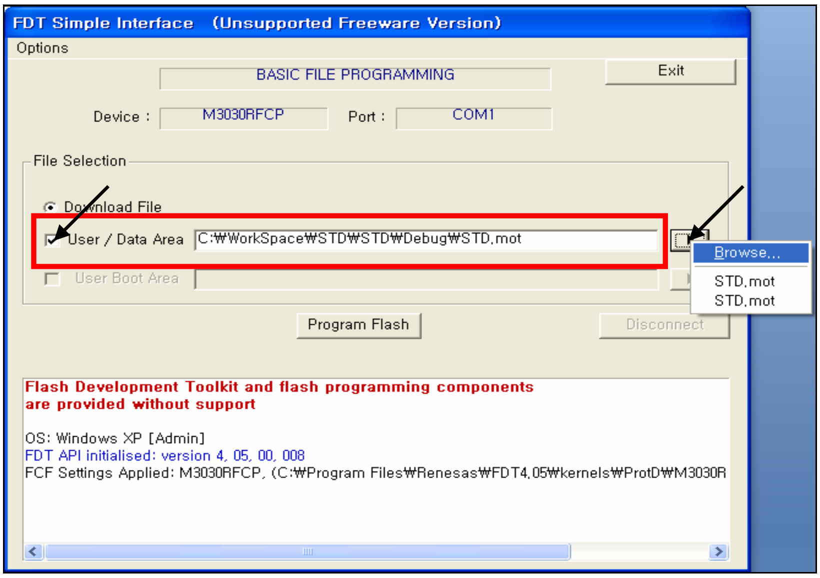
3-1-3. Program Download

<table>
<tr><th>No</th><th>Description</th></tr>
<tr><td>8</td><td>

– Click the Options menu and check the “AutoDisconnect”

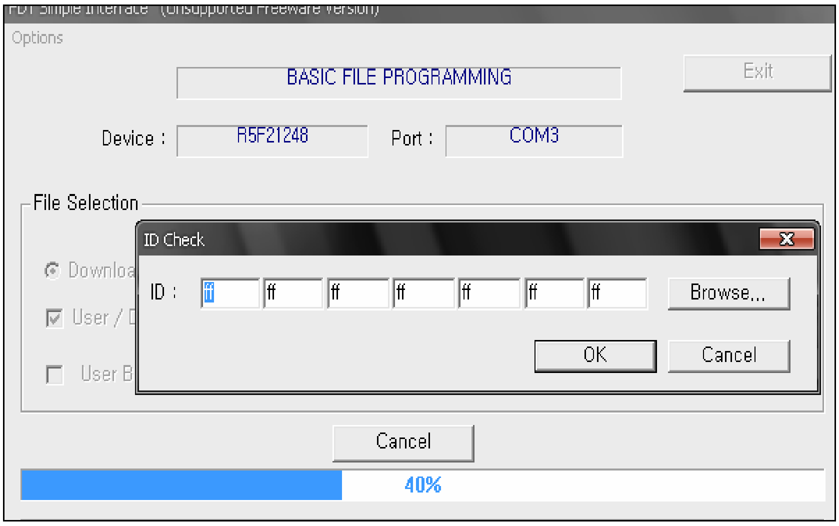
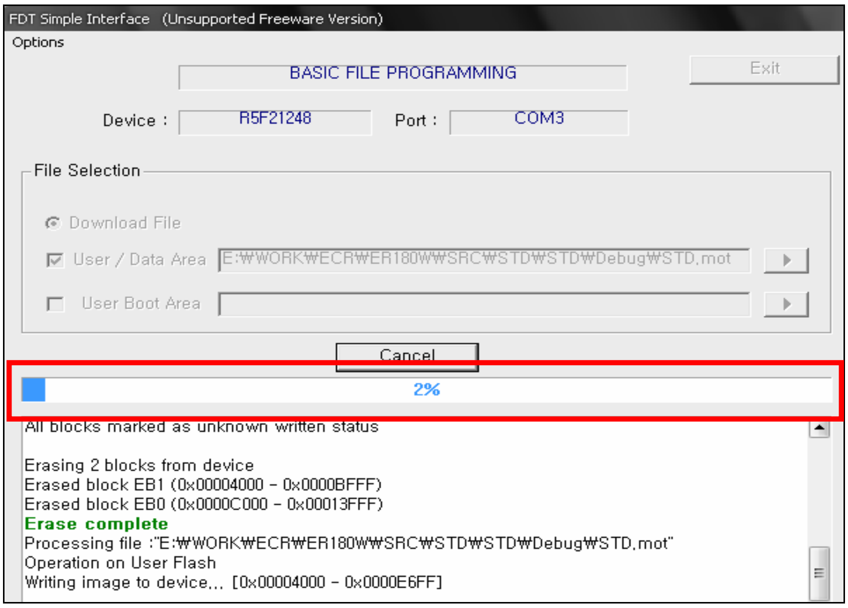


– Select the downloaded file. Check the Download File and “User/Data Area”.
Press arrow button and open “180T.mot”file.



</td></tr>
</table>

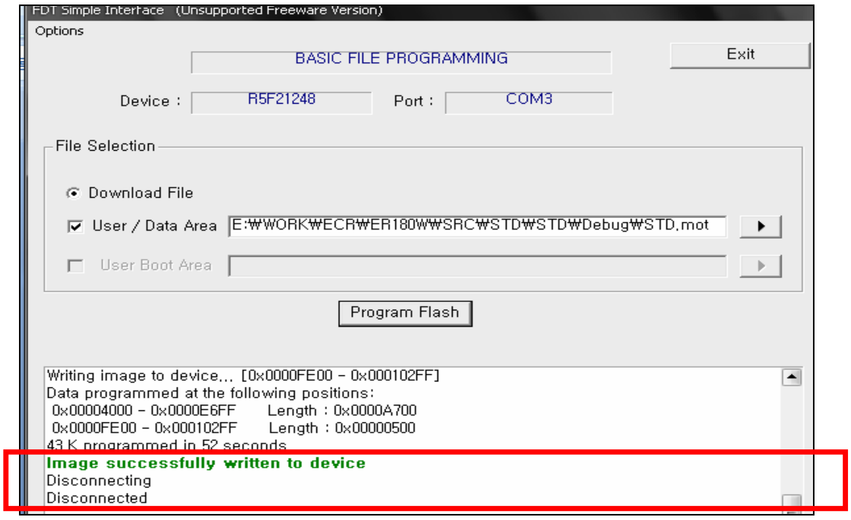
3-1-3. Program Download

No	Description
9	– After selecting downloaded file then press “Program Flash”. If you see “ID Check” dialog, then press OK.  – See the progress bar is going as below picture. 

3-1-3. Program Download

<table>
<tr><th>No</th><th>Description</th></tr>
<tr><td>10</td><td>

– If downloading is successful, green color “Image successfully written to device” will displayed as below.



– Unplug the DC power cord.

– Unplug the download cable

– Reassemble drawer and assemble the screw as original status.

– Plug the DC power cord.

– Do the RAM ALL CLEAR and program other settings again (date and time..)

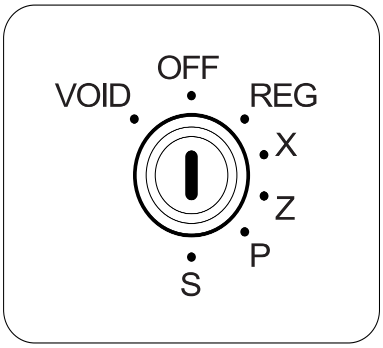
</td></tr>
</table>

3-2 Operation

Note: Before using this Electronic Cash Register (ECR) for the first time, leave it powered ON in the REG mode for a at least 24 hours. This allows the Ms-Lithium battery, which maintains the ECR's memory while the power is OFF, to fully charge.

3-2-1 Mode

The position of the Mode determines the action of the ECR. The modes are as shown in Table 3-3



Mode	Key	Function
OFF	-	The Register is inoperable.
REG	REG	Use for normal registrations.
X	X	Use to read register reports and perform other manager functions.
Z	Z	Use to read register reports and reset totals to zero.
PGM	P	Use to program the register
S	C	Use for H/W tests and special setting.

Table3-1 Mode Function

3-2 Operation

3-2-2 Key Board Matrix

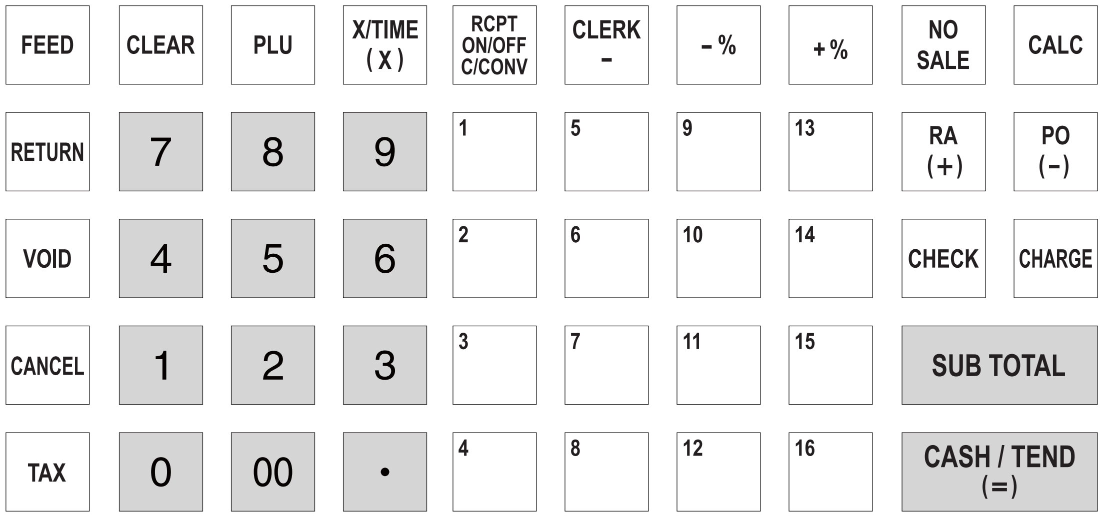


Figure 3-2. Key Board

3-2-3 Initial Clear

1. Unplug the register.
2. Turn the control lock to the **P** position.
3. Press and hold the key position where the "**SUB TOTAL"** key is located on the default keyboard layout.
4. While continuing to hold the "**SUB TOTAL"** key, plug the register into a power source.
5. The message "****** INITIAL CLEAR ******" prints when the initial clear is complete.

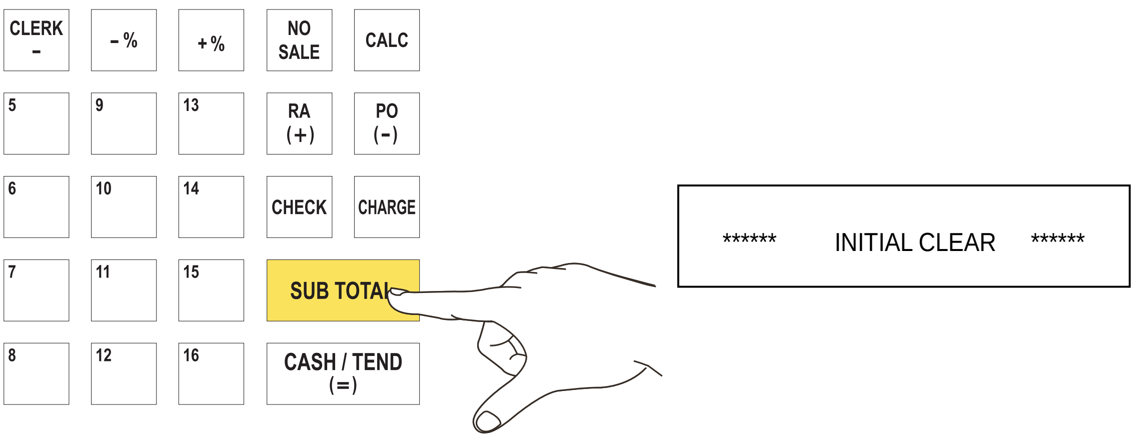


Figure3-3. Initial Clear Key & Print Sheet

3-2 Operation

3-2-4 All Clear

This step insures that the cash register is cleared of any totals or programming. After this procedure, the cash register is ready for programming and operation.

WARNING:This is a one time procedure. Do not repeat this procedure after the cash register is
WARNING: programmed, it causes all programs and totals to be erased and to be default.

1. Unplug the register.
2. Turn the control lock to the **S** position.
3. Press and hold the key position where the **"A"** key is located on the default keyboard layout.
4. Continue to hold the **"A"** key while plugging the register into a power source.
5. Press the upper left key of the keyboard, then the lower left key, then the upper right key, and finally press the lower right key.

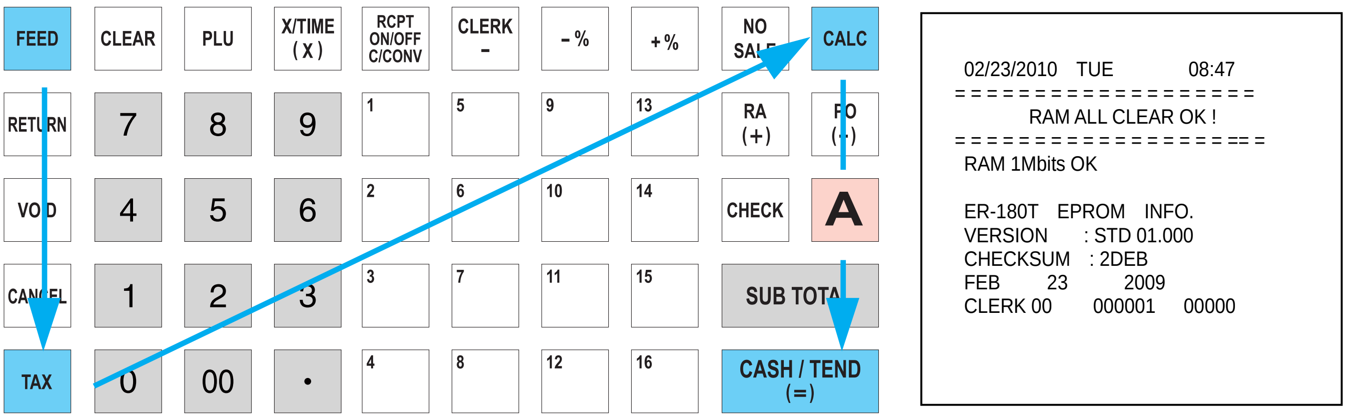


Figure3-4. All Clear Key Sequence & Print Sheet

3-2 Operation

3-2-5 Self Test

3-2-5-(a) Test Printer

1. Turn the Mode switch to Service Mode position.
2. Press '**1', '0'** and **'SUB TOTAL'** key on key board.
3. Then the printer prints the test pattern.
4. After printing, The drawer is opened. Then the printer test is finished.

3-2-5-(b) Test Display

1. Turn the Mode switch to Service Mode position.
2. Press '**1', '1'** and **'SUB TOTAL'** key on key board.
3. Check the Display.

3-2-5-(c) Test Key Board

1. Turn the Mode switch to Service Mode position.
2. Press Press '**1', '2'** and **'SUB TOTAL'** key on key board.
3. Press each key on the keyboard one key at the time.
   As you press each key. The Display shows the key's location code.

3-2-5-(d) Test Mode Switch

1. Turn the Mode switch to Service Mode position.
2. Press Press '**1', '3'** and **'SUB TOTAL'** key on key board.
3. Turn the Mode key and check the display.

4 Assembly and Disassembly

This chapter describes the Disassembly and Reassembly procedures.

WARNING: This ECR contains electro-statically sensitive devices.
Use caution when handling any components in this system.

4-1 Disassembly

CAUTION: Disconnect the ECR from the external power source before Disassembly.

A. Disassembly Procedure

1. Separate the COVER PRINTER ASSEMBLY (①). (Page 5-1)
2. Remove a screw (⑪) on the CASE UPPER (⑫) and pull it forward and up and then the CASE UPPER (⑫) will be open. (Page 5-1)
3. Remove the DRAWER CONNECTOR (ⓖ) on the MAIN BOARD (㉗). (Page 5-1)
4. Separate the DRAWER (B) from the CASE UPPER (⑫). (Page 5-1)
5. Separate the seven harnesses (ⓐ,ⓑ,ⓒ,ⓓ,ⓔ,ⓕ,ⓙ) can be removed from the MAIN BOARD(㉗).
6. Separate the HOLDER MOTOR (⑮) and POWER CONNECTOR (⑱) from the CASE UPPER (⑫). (Page 5-1)
7. Remove four screws (⑳,㉑) on the CASE UPPER (⑫) and Separate the PRINTER ASSEMBLY(㉖) and MAIN BOARD (㉗) from the CASE UPPER(⑫). (Page 5-1)
8. Remove two screws (⑯) on the COVER DISPLAY (⑥) and Separate the DISPLAY BOARD(⑰), from the CASE UPPER(⑫). (Page 5-1)
9. Remove three screws (⑲) on the CASE UPPER (⑫) and Separate the KEYBOARD ASSEMBLY(㉙), from the CASE UPPER(⑫). (Page 5-1)
10. Separate the COVER DISPLAY(⑥)from the CASE UPPER(⑫). (Page 5-1)
11. Remove two screws (⑩) on the CASE UPPER (⑫) and Separate the MODE SWITCH(⑬), from the CASE UPPER(⑫). (Page 5-1)

B. Reassembly Procedure

- Reassembly procedure is in reverse order.

Memo

5 Exploded View and Parts List

[Exploded View]

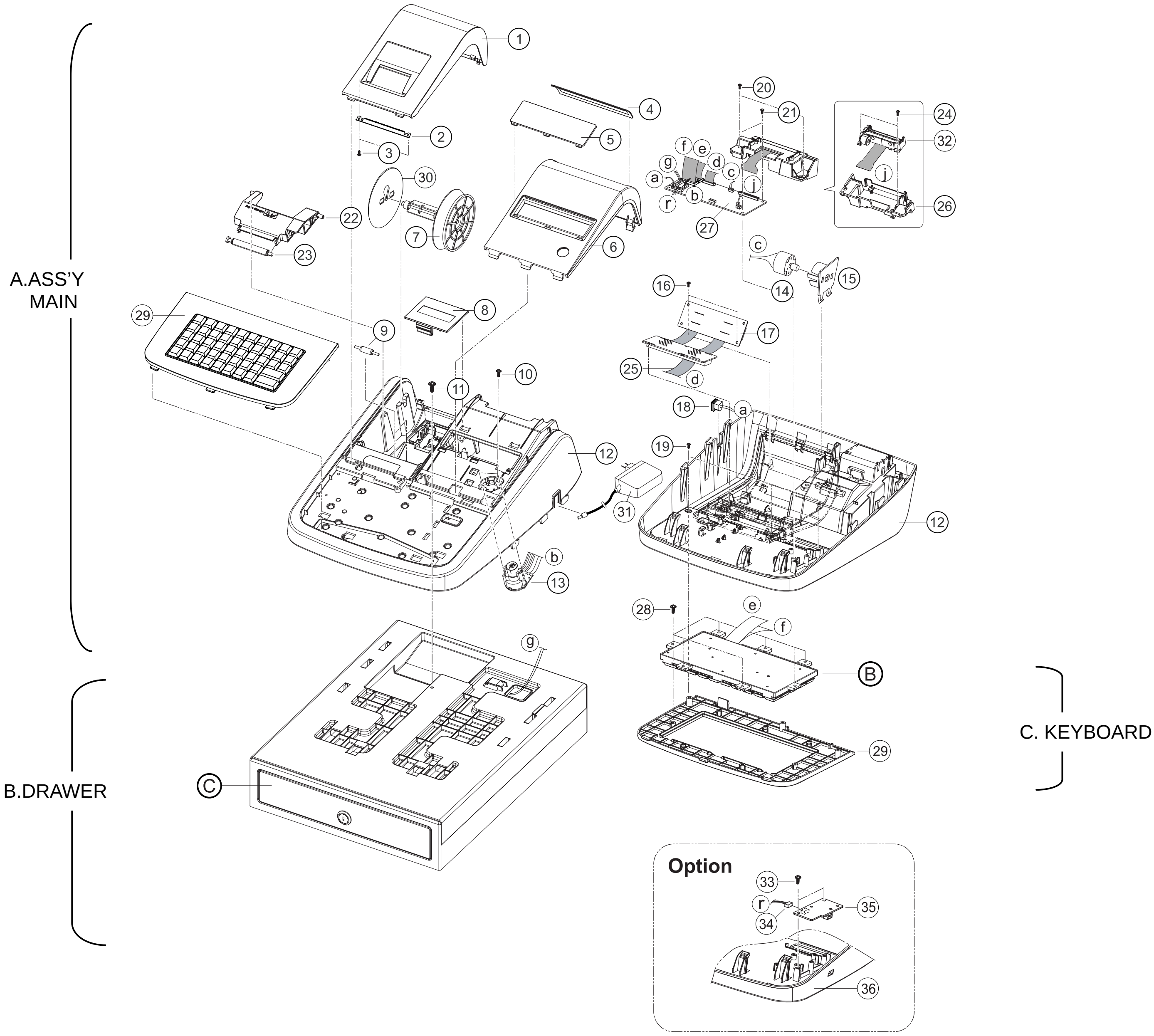


Figure 5-1. Total Disassembly

A. ASS'Y MAIN

No	Parts-No.	Description/Specification	Q'ty	Design-Location	Serviceable	Remark
1	JK72-20379A	PMO-COVER PRINTER	1		Y	
2	JK70-20152A	IPR-CUTTER PAPER	1		Y	
3	JK70-50011A	SCREW-TAPPING:PH,M2,L4	2		Y	
4	JK72-20385A	PMO-WINDOW REAR	1		Y	
5	JK72-20384A	PMO-WINDOW FRONT	1		Y	
6	JK72-20378A	PMO-COVER DISPLAY	1		Y	
7	JK72-20015A	PMO-SPOOL WINDING	1		Y	OPTION
8	JK72-20377A	PMO-COVER BATTERY	1		Y	
9	JK72-40330A	PMO-ROLLER PAPER/END	2		Y	
10	6002-000174	SCREW-TAPPING:PWH,M3,L10	2	C/UPPER + MODE KEY ASS'Y	Y	
11	JK70-50056A	SCREW-TAPPING:PWH,M4,L10	1	C/UPPER+B DRAWER	Y	
	6003-001149	SCREW-TAPTITE:PWH,M4,L10	1	C/UPPER+G DRAWER(OPTION)	Y	
12	JK72-20376A	PMO-CASE UPPER	1		Y	
13	JK96-01001B	ELA UNIT-MODE S/W	1		Y	
14	JK96-00937C	ELA-MOTOR	1		Y	OPTION
15	JK72-40932B	PMO-HOLDER MOTOR	1		Y	OPTION
16	JK70-50026A	SCREW-TAPPING;PWH,M2.6,L8	2	C/DISPLAY + R/DISPLAY PCB	Y	
17	JK92-01647A	PBA-DISPLAY:DUAL	1		Y	OPTION
	JK92-01648A	PBA-DISPLAY:FRONT	1		Y	
18	JK39-40800A	HARNESS-POWER	1		Y	
19	6002-000174	SCREW-TAPPING:PWH,M3,L10	3	C/UPPER + KEYBOARD ASS'Y	Y	
20	6002-000174	SCREW-TAPPING:PWH,M3,L10	2	C/UPPER + PRINTER ASS'Y	Y	
21	6002-000174	SCREW-TAPPING:PWH,M3,L10	2	C/UPPER + MAIN PCB	Y	
22	JK70-30023A	PMO-HOUSING CLAM	1		Y	
23	JK81-20094A	AS-PLATEN ROLLER:LTPZ225(4DOT)	1		Y	
24	JK70-50012A	SCREW-TAPPING*PH,+,M2.6,L6	2	H/PRINTER + PRINTER	Y	
25	JK39-40803A	HAR-DISPLAY FFC:ER180,16P,130mm	1		Y	
26	JK72-20381A	PMO-HOLDER PRINTER(T)	1		Y	
27	JK92-01646A	PBA MAIN-BOARD	1		Y	
28	6002-000175	SCREW-TAPPING:PWH,M3,L8	7	KEYBOARD + KBD HOUSING	Y	
29	JK72-20389A	PMO-KBD HOUSING	1		Y	
30	JK72-20016A	PMO-GUIDE WINDING	1		Y	OPTION
31	JK44-30507A	ADAPTOR:EUROPE	1		Y	
	JK44-30507B	ADAPTOR:USA	1		Y	
	JK44-30507C	ADAPTOR:AUSTRALIA	1		Y	
	JK44-30507D	ADAPTOR:UK	1		Y	
32	JK59-20016A	UNIT-PRINTER	1		Y	
33	6002-000174	SCREW-TAPPING:PWH,M3,L10	2	C/UPPER + CIGAR PCB	Y	OPTION
34	JK39-40805A	HARNESS-CIGAR JACK	1		Y	OPTION
35	JK92-01649A	PBA-CICARJACK:ER-180,OPTION	1		Y	OPTION
36	JK72-20376D	PMO-CASE UPPER	1		Y	OPTION

B. DRAWER (B-TYPE) – BOTTOM : MOLD LOCK

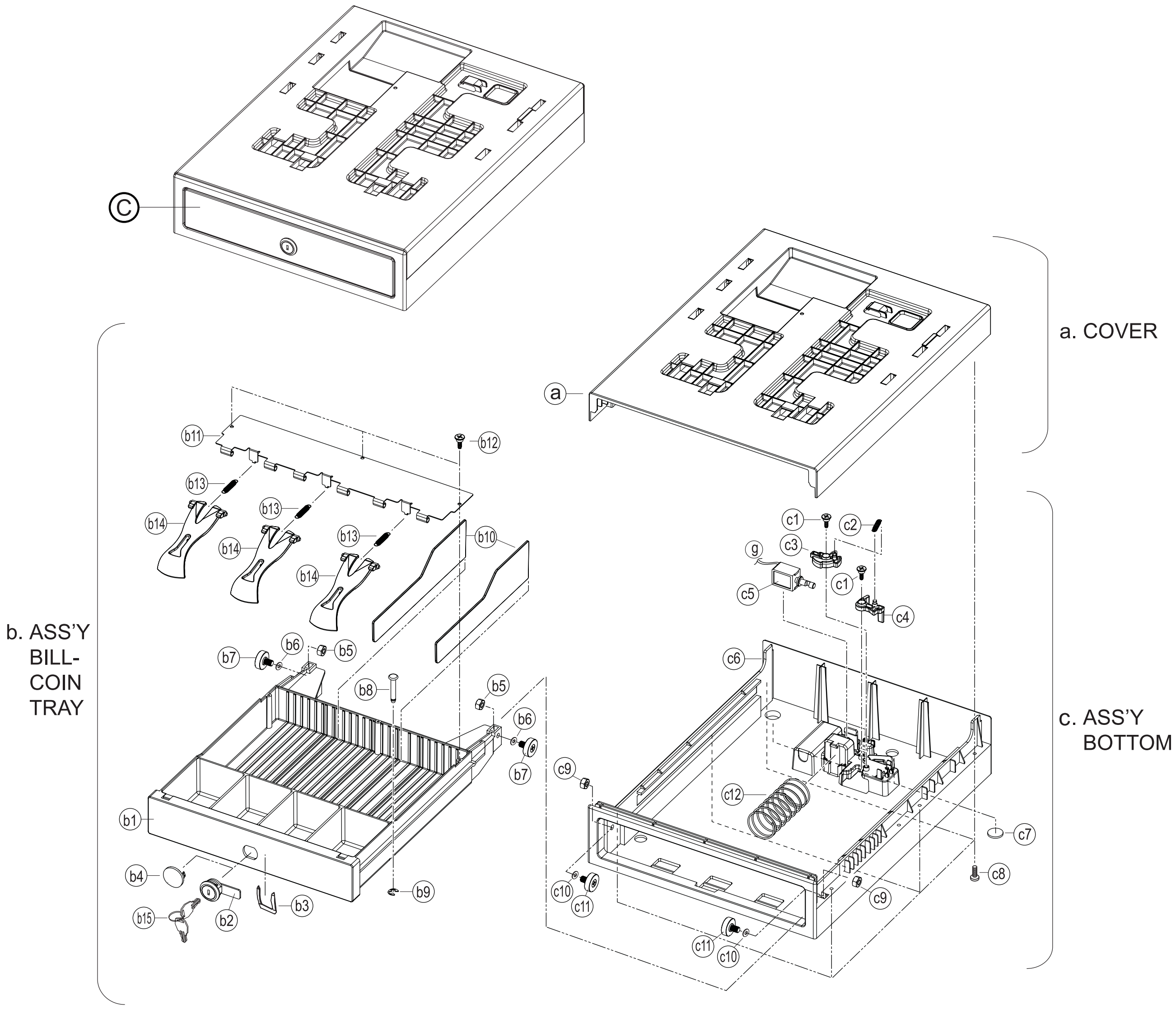


Figure 5-2. B-TYPE DRAWER (BOTTOM : MOLD LOCK)

B. DRAWER (B-TYPE) – BOTTOM : MOLD LOCK

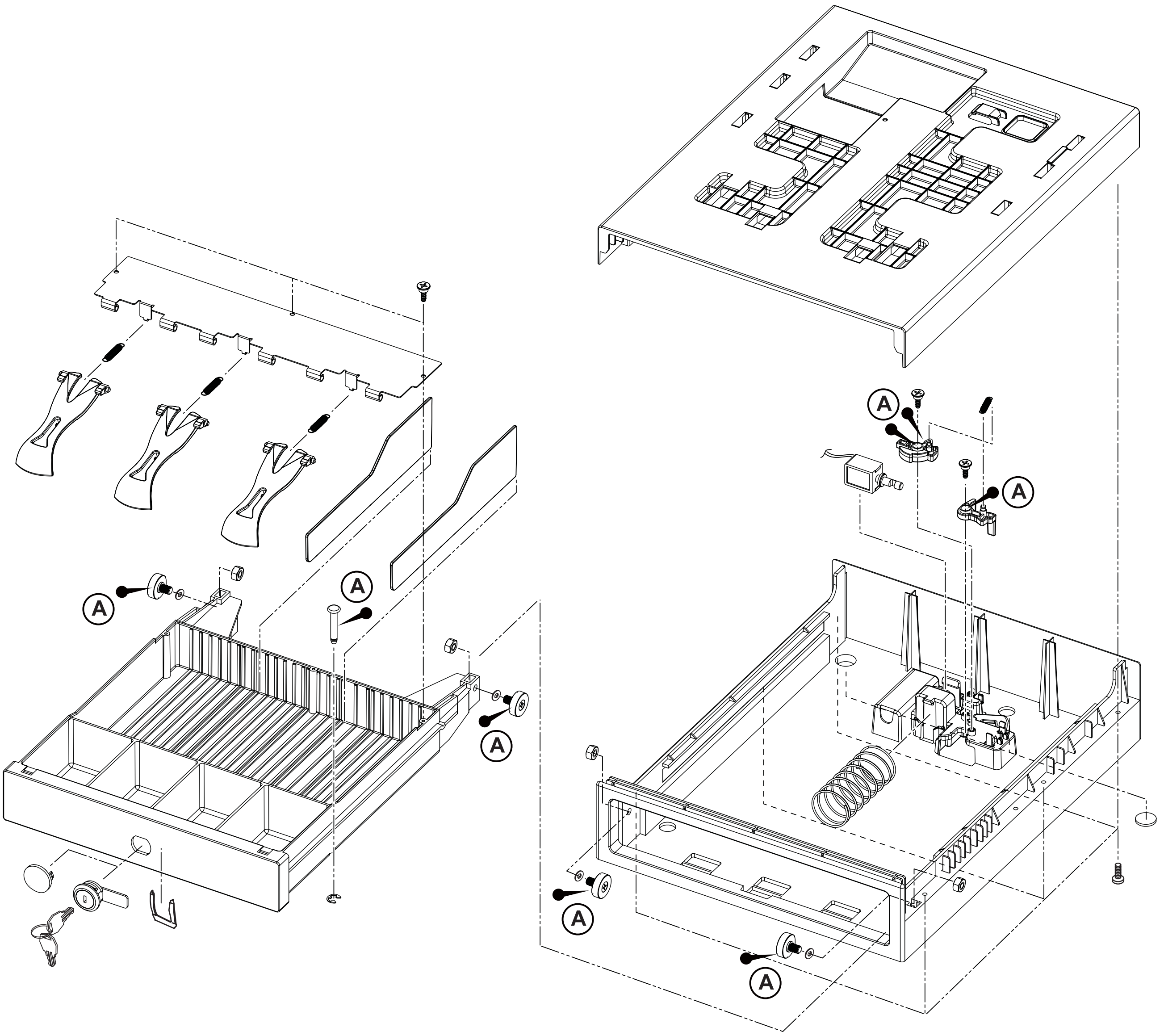


Figure 5-3. Lubrication Points of the B-TYPE Drawer (BOTTOM : MOLD LOCK)

No.	Code No.	Description / Specification	Q`ty	Serviceable	Remark
A	0201-002010	GREASE-N2	-	Y	Minimum Serviceable Packing Weight : 40g

B. DRAWER (B-TYPE) –BOTTOM : MOLD LOCK

DRAWER

No	Parts-No.	Description/Specification	Q'ty	Design-Location	Serviceable	Remark
C	JK75-20104A	MEC-DRAWER B43ND:3B4C,7V,BLK	1	MOLD LOCK ASS'Y	Y	
	JK75-20105A	MEC-DRAWER B44ND:4B4C,7V,BLK	1		Y	
	JK75-20097A	MEC-DRAWER B43LD:3B4C,7V,BLK,KEY	1		Y	OPTION
	JK75-20099A	MEC-DRAWER B44LD:4B4C,7V,BLK,KEY	1		Y	OPTION

a. ASS'Y COVER

No	Parts-No.	Description/Specification	Q'ty	Design-Location	Serviceable	Remark
a	JK72-20386A	PMO-COVER HOUSING	1		Y	

b. ASS'Y BILL-COIN TRAY

No	Parts-No.	Description/Specification	Q'ty	Design-Location	Serviceable	Remark
b1	JK72-40242C	PMO-BILL_COIN TRAY			Y	
b2	JK75-10389A	MEC-LOCK	1		Y	OPTION
b3	JK70-10323A	IPR-PLATE CLIP	1		Y	OPTION
b4	JK72-40241C	PMO-DRAWER BUSHING KEY	1		Y	
b5	6021-000225	NUT-HEXAGON	2		Y	
b6	6031-000243	WASHER-PLAIN	2		Y	
b7	JK75-10386A	MEC-ROLLER(Ø19)	2		Y	
b8	JK70-40302A	ICT-SHAFT PIN	1		Y	
b9	6044-000124	RING-E	1		Y	
b10	JK72-40240C	PMO-BILL PARTITION	3(4)		Y	
b11	JK70-20119A	IPR-PLATE HOLDER_B3	1		Y	
	JK70-20120A	IPR-PLATE HOLDER_B4	1		Y	
b12	6002-000193	SCREW-TAPPING :RH,M3,L6	3		Y	
b13	JK70-30014B	SPRING-LEVER PRESS(MD)	3(4)		Y	
b14	JK72-20259A	PMO-LEVER PRESS	3(4)		Y	
b15	JK70-20025B	IPR-KEY DRAWER	1		Y	OPTION

c. ASS'Y BOTTOM

No	Parts-No.	Description/Specification	Q'ty	Design-Location	Serviceable	Remark
c1	JK70-50115A	SCREW-TAPPING SPECIAL	2		Y	
c2	6107-001041	SPRING-LOCK LEVER	1		Y	
c3	JK72-20387A	PMO-LATCH 1	1		Y	
c4	JK72-20388A	PMO-LATCH 2	1		Y	
c5	JK33-10501A	SOLENOID-DC	1		Y	
c6	JK72-40375C	PMO-COVER BOTTOM	1		Y	
c7	JK61-40201A	FOOT	2		Y	
c8	6002-000175	SCREW-TAPPING	6		Y	
c9	6021-000225	NUT-HEXAGON	2		Y	
c10	6031-000243	WASHER-PLAIN	2		Y	
c11	JK75-10386A	MEC-ROLLER	2		Y	
c12	JK70-30024A	SPRING-PUSH	1		Y	

B. DRAWER (B-TYPE) – BOTTOM : STEEL LOCK

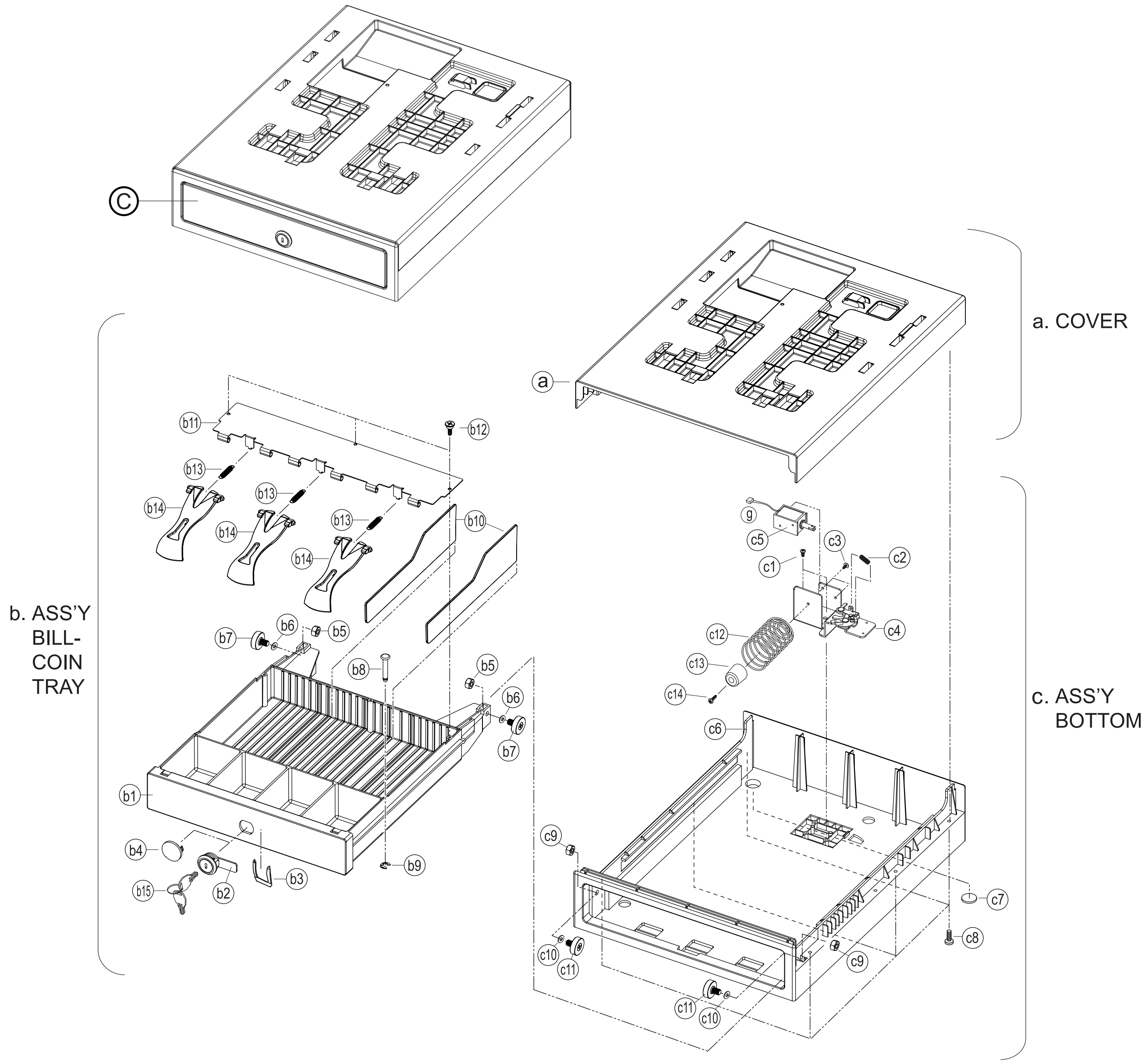


Figure 5-2. B-TYPE DRAWER (BOTTOM : STEEL LOCK)

B. DRAWER (B-TYPE) – BOTTOM : STEEL LOCK

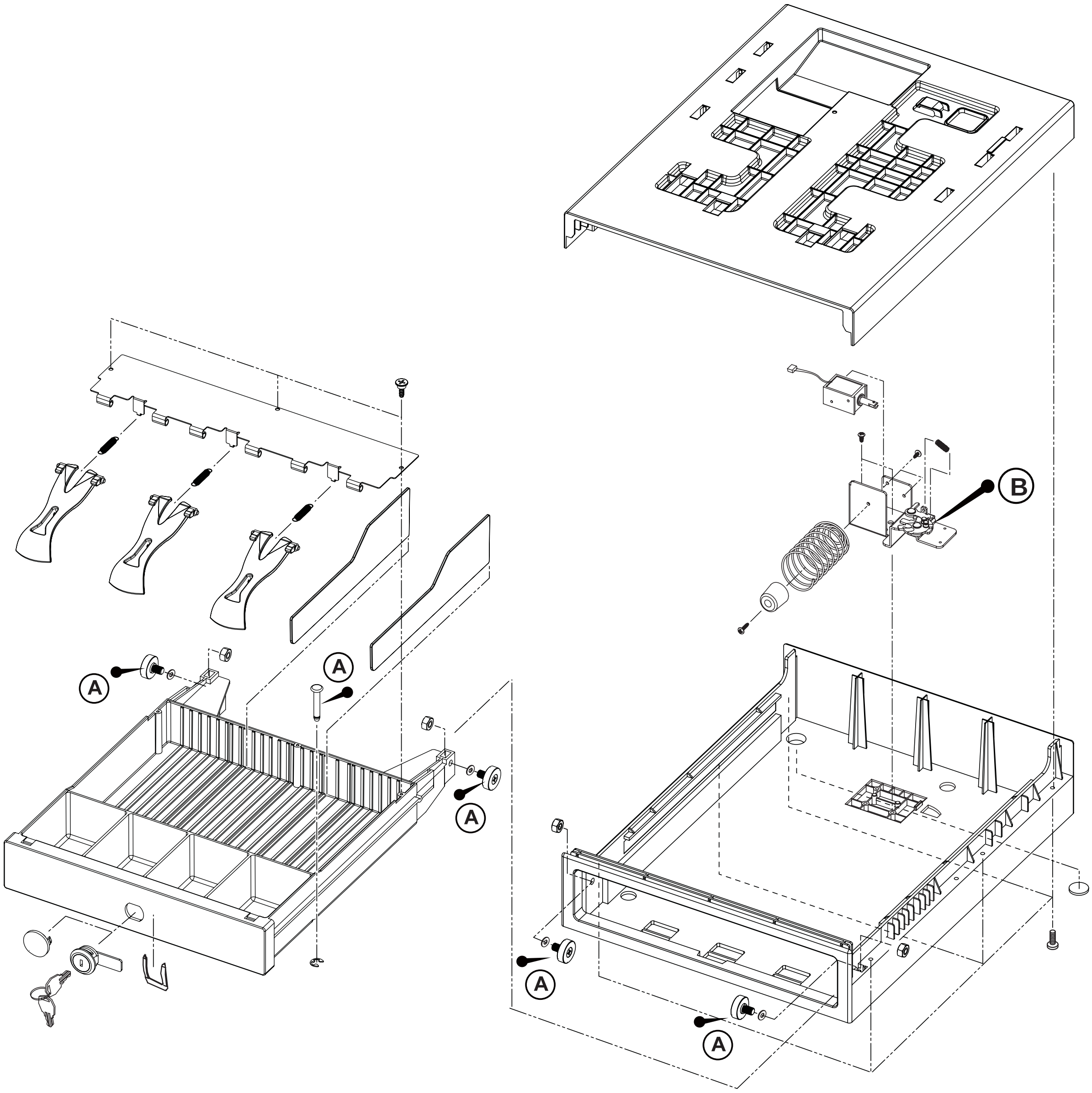


Figure 5-3. Lubrication Points of the B-TYPE Drawer (BOTTOM : STEEL LOCK)

No.	Code No.	Description / Specification	Q`ty	Serviceable	Remark
A	0201-002010	GREASE-N2	-	Y	Minimum Serviceable Packing Weight : 40g
B	0201-002009	GREASE-N1	-	Y	Minimum Serviceable Packing Weight : 40g

B. DRAWER (B-TYPE) - BOTTOM : STEEL LOCK

DRAWER

No	Parts-No.	Description/Specification	Q'ty	Design-Location	Serviceable	Remark
C	JK75-20104B	MEC-DRAWER B43ND2:3B4C,7V,BLK	1	STEEL LOCK ASS'Y	Y	
	JK75-20105B	MEC-DRAWER B44ND2:4B4C,7V,BLK	1		Y	
	JK75-20097B	MEC-DRAWER B43LD2:3B4C,7V,BLK,KEY	1		Y	OPTION
	JK75-20099B	MEC-DRAWER B44LD2:4B4C,7V,BLK,KEY	1		Y	OPTION

a. ASS'Y COVER

No	Parts-No.	Description/Specification	Q'ty	Design-Location	Serviceable	Remark
a	JK72-20386A	PMO-COVER HOUSING	1		Y	

b. ASS'Y BILL-COIN TRAY

No	Parts-No.	Description/Specification	Q'ty	Design-Location	Serviceable	Remark
b1	JK72-40242C	PMO-BILL_COIN TRAY			Y	
b2	JK75-10389A	MEC-LOCK	1		Y	OPTION
b3	JK70-10323A	IPR-PLATE CLIP	1		Y	OPTION
b4	JK72-40241C	PMO-DRAWER BUSHING KEY	1		Y	
b5	6021-000225	NUT-HEXAGON	2		Y	
b6	6031-000243	WASHER-PLAIN	2		Y	
b7	JK75-10386A	MEC-ROLLER(Ø19)	2		Y	
b8	JK70-40302A	ICT-SHAFT PIN	1		Y	
b9	6044-000124	RING-E	1		Y	
b10	JK72-40240C	PMO-BILL PARTITION	3(4)		Y	
b11	JK70-20119A	IPR-PLATE HOLDER_B3	1		Y	
	JK70-20120A	IPR-PLATE HOLDER_B4	1		Y	
b12	6002-000193	SCREW-TAPPING :RH,M3,L6	3		Y	
b13	JK70-30014B	SPRING-LEVER PRESS(MD)	3(4)		Y	
b14	JK72-20259A	PMO-LEVER PRESS	3(4)		Y	
b15	JK70-20025B	IPR-KEY DRAWER	1		Y	OPTION

c. ASS'Y BOTTOM

No	Parts-No.	Description/Specification	Q'ty	Design-Location	Serviceable	Remark
c	JK97-20093K	MEA-UNIT LOCK(7V)	1		Y	
	JK97-20093L	MEA-UNIT LOCK(7V,COM)	1		Y	
c1	6001-000525	SCREW-MACHINE: M3,L14	2		Y	
c2	6107-001041	SPRING-LOCK LEVER	1		Y	
c3	JK70-50079A	SCREW-TAPTITE: M3,L5	2		Y	
c4	JK97-01080B	MEC-SUB LOCK	1		N	
c5	JK27-10500C	SOLENOID-DC: 7V	1		Y	
c6	JK72-40375C	PMO-COVER BOTTOM	1		Y	
c7	JK61-40201A	FOOT	2		Y	
c8	6002-000175	SCREW-TAPPING	6		Y	
c9	6021-000225	NUT-HEXAGON	2		Y	
c10	6031-000243	WASHER-PLAIN	2		Y	
c11	JK75-10386A	MEC-ROLLER	2		Y	
c12	JK70-30019A	SPRING-PUSH	1		Y	
c13	JK70-50090A	PLAIN-WASHER	1		Y	
c14	JK70-50092A	SCREW-TAPTITE: M5,L10	1		Y	

B. DRAWER (G-TYPE)

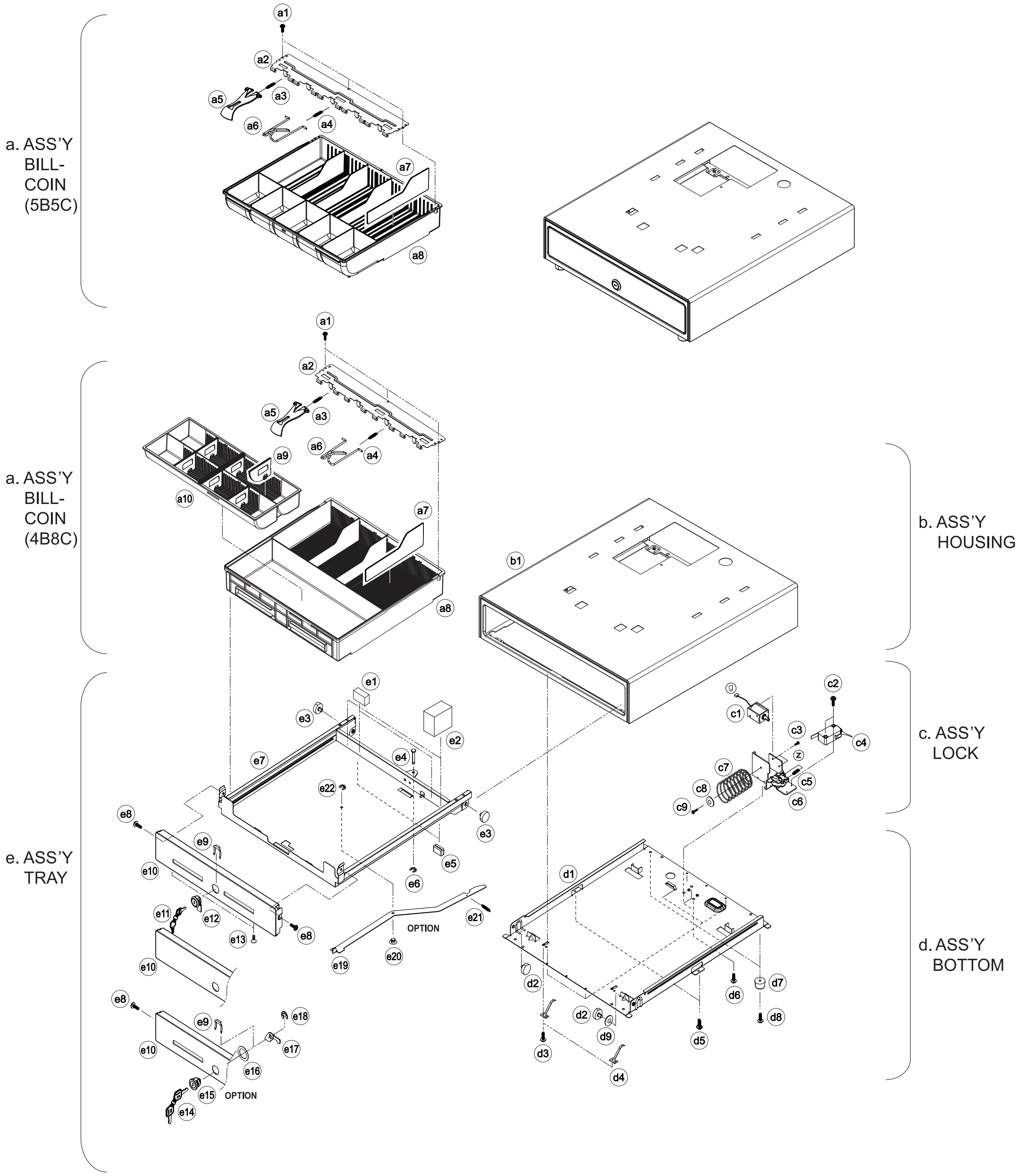


Figure 5-4. G-TYPE DRAWER

B. DRAWER (G-TYPE)

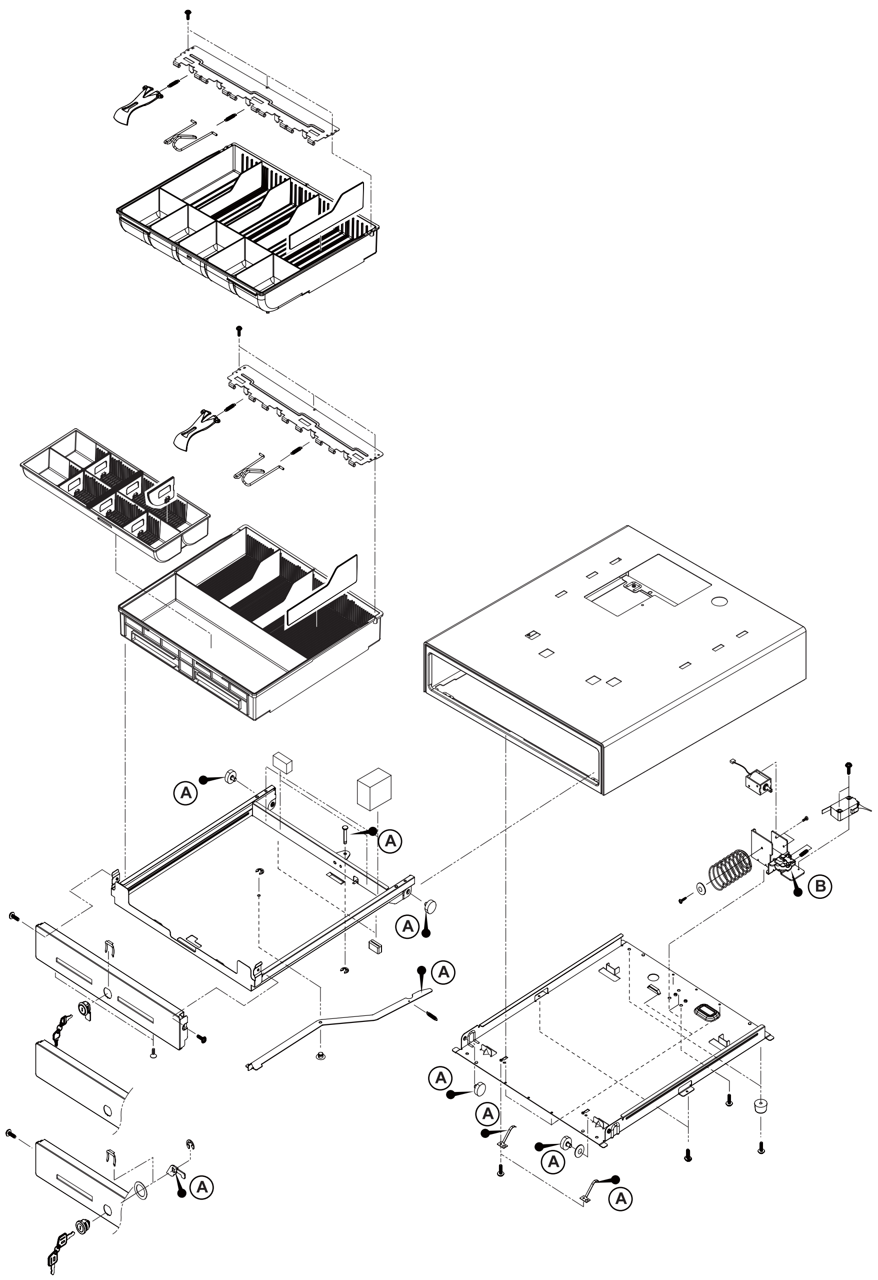


Figure 5-5. Lubrication Points of the G-TYPE Drawer

No.	Code No.	Description / Specification	Q`ty	Serviceable	Remark
A	0201-002010	GREASE-N2	-	Y	Minimum Serviceable Packing Weight : 40g
B	0201-002009	GREASE-N1	-	Y	Minimum Serviceable Packing Weight : 40g

B. DRAWER (G-TYPE)

DRAWER

No	Parts-No.	Description/Specification	Q'ty	Design-Location	Serviceable	Remark
C	JK75-20102BN	MEC-DRAWER G84NPB-7V:4B8C,NO COM	1		Y	
	JK75-20103BN	MEC-DRAWER G55NPB-7V:4B8C,NO COM	1		Y	

a. ASS'Y BILL-COIN(5B5C)

No.	Code No.	Description / Specification	Q`ty	Design-Location	Serviceable	Remark
a1	6002-000175	SCREW-TAPPING : M3,L8	3		Y	
a2	JK70-20113A	IPR-HOLDER PLATE(5B5C)	1		Y	
a3	JK70-30014B	SPRING-LEVER PRESS(MD)	4		Y	
a4	JK70-30015A	SPRING-LEVER PRESS(PD)	4		Y	OPTION
a5	JK72-20259A	PMO-LEVER PRESS	4		Y	
a6	JK70-20067A	IPR-LEVER PRESS	4		Y	OPTION
a7	JK72-40269A	PMO-BILL PARTITION	3		Y	
a8	JK72-40268A	PMO-BILL COIN TILL : 4B8C	1		Y	

a. ASS'Y BILL-COIN(4B8C)

No.	Code No.	Description / Specification	Q`ty	Design-Location	Serviceable	Remark
a	JK97-20094B	MEA-UNIT BILL COIN(4B8C,PLASTIC)	1		Y	
a1	6002-000175	SCREW-TAPPING : M3,L8	3		Y	
a2	JK70-20114A	IPR-HOLDER PLATE(4B8C)	1		Y	
a3	JK70-30014B	SPRING-LEVER PRESS(MD)	4		Y	
a4	JK70-30015A	SPRING-LEVER PRESS(PD)	4		Y	OPTION
a5	JK72-20259A	PMO-LEVER PRESS	4		Y	
a6	JK70-20067A	IPR-LEVER PRESS	4		Y	OPTION
a7	JK72-40269A	PMO-BILL PARTITION	3		Y	
a8	JK72-20088A	PMO-BILL COIN TILL : 4B8C	1		Y	
a9	JK72-20090A	PMO-COIN PARTITION	6		Y	
a10	JK72-20089A	PMO-COIN TILL	1		Y	

b. ASS'Y HOUSING

No.	Code No.	Description / Specification	Q`ty	Design-Location	Serviceable	Remark
b	JK97-20095J	MEA-UNIT HOUSING(STD,BLK)	1		N	

c. ASS'Y LOCK

No.	Code No.	Description / Specification	Q`ty	Design-Location	Serviceable	Remark
c	JK97-20093K	MEA-UNIT LOCK(7V)	1		Y	
	JK97-20093L	MEA-UNIT LOCK(7V,COM)	1		Y	
c1	JK27-10500C	SOLENOID-DC: 7V	1		Y	
c2	6001-000525	SCREW-MACHINE: M3,L14	2		Y	
c3	JK70-50079A	SCREW-TAPTITE: M3,L5	2		Y	
c4	JK39-40301R	CBF HARNESS MICRO S/W	1		Y	
c5	6107-001041	SPRING-LOCK LEVER	1		Y	
c6	JK97-01080B	MEC-SUB LOCK	1		N	
c7	JK70-30019A	SPRING-PUSH	1		Y	
c8	JK70-50090A	PLAIN-WASHER	1		Y	
c9	JK70-50092A	SCREW-TAPTITE: M5,L10	1		Y	

B. DRAWER (G-TYPE)

d. ASS’Y BOTTOM

No.	Code No.	Description / Specification	Q`ty	Design-Location	Serviceable	Remark
d	JK97-20096A	MEA-UNIT BOTTOM(5B5C)	1		N	
	JK97-20096B	MEA-UNIT BOTTOM(4B8C)	1		N	
d1	JK70-20115A	IPR-BOTTOM PLATE(5B5C)	1		N	
	JK70-20115B	IPR-BOTTOM PLATE(4B8C)	1		N	
d2	JK75-20068A	MEC-ROLLER(Φ 22)	2		Y	
d3	6003-000266	SCREW-TAPTITE: M3,L6	2		Y	
d4	JK70-10401A	IPR-PLATE GROUND	2		Y	
d5	6003-000266	SCREW-TAPTITE: M3,L6	6		Y	
d6	JK70-50092A	SCREW-TAPTITE: M5,L10	3		Y	
d7	JK61-40200B	FOOT-RUBBER: BALCK	4		Y	
d8	6002-000234	SCREW-TAPPING: M4,L16	4		Y	
d9	JK70-50093A	PLAIN-WASHER	1		Y	

e. ASS’Y TRAY

No.	Code No.	Description / Specification	Q`ty	Design-Location	Serviceable	Remark
e	JK97-20097E	MEA-UNIT TRAY TILL(5B5C,BLK,UNV)	1		N	
	JK97-20097F	MEA-UNIT TRAY TILL(5B5C,BLK,UNV,MANUAL OPEN)	1		N	
	JK97-20098C	MEA-UNIT TRAY TILL(4B8C,BLK)	1		N	
	JK97-20098D	MEA-UNIT TRAY TILL(4B8C,BLK, MANUAL OPEN)	1		N	
e1	JK73-10203A	RMO-TENSION	2		Y	
e2	JK73-30901A	RMO-SPONGE(UNIVESAL)	2		Y	
e3	JK75-20068A	MEC-ROLLER(Φ 22)	2		Y	
e4	JK70-40302A	ICT-SHAFT PIN	1		Y	
e5	JK70-60041A	RMO-RUBBER STOPPER	2		Y	
e6	6044-000124	RING-E: ID3	1		Y	
e7	JK97-20100A	MEA-TRAY TILL	1		N	
e8	6003-000266	SCREW-TAPTITE: M3,L6	2		Y	
e9	JK70-10323A	IPR-PLATE CLIP	1		Y	
e10	JK70-20108B	IPR-FRONT PANEL(5B5C,BLK)	1		Y	
	JK70-20108D	IPR-FRONT PANEL(4B8C,BLK)	1		Y	
e11	JK70-20025B	IPR-KEY DRAWER	1SET		Y	
e12	JK75-20067A	MEC-KEY LOCK	1		Y	
e13	JK70-50094A	SCREW-TAPTITE: M3,L8	2		Y	
e14	JK70-20075A	IPR-KEY DRAWER: #2424	1SET		Y	OPTION
e15	JK75-20041A	MEC-KEY LOCK: #2424	1		Y	OPTION
e16	JK70-20120A	IPR-DUMMY KEY	1		Y	OPTION
e17	JK70-20074A	IPR-LEVER LOCK	1		Y	OPTION
e18	6044-000124	RING-E: ID3	1		Y	OPTION
e19	JK70-20116A	IPR-LEVER PUSH	1		Y	OPTION
e20	JK70-40905A	ICT-SHAFT LEVER PUSH	1		Y	OPTION
e21	JK70-30020A	SPRING-LEVER PUSH	1		Y	OPTION
e22	6044-000231	RING-E: ID5	1		Y	OPTION

C. ASS'Y KEYBOARD (LASER PRINTING TYPE)

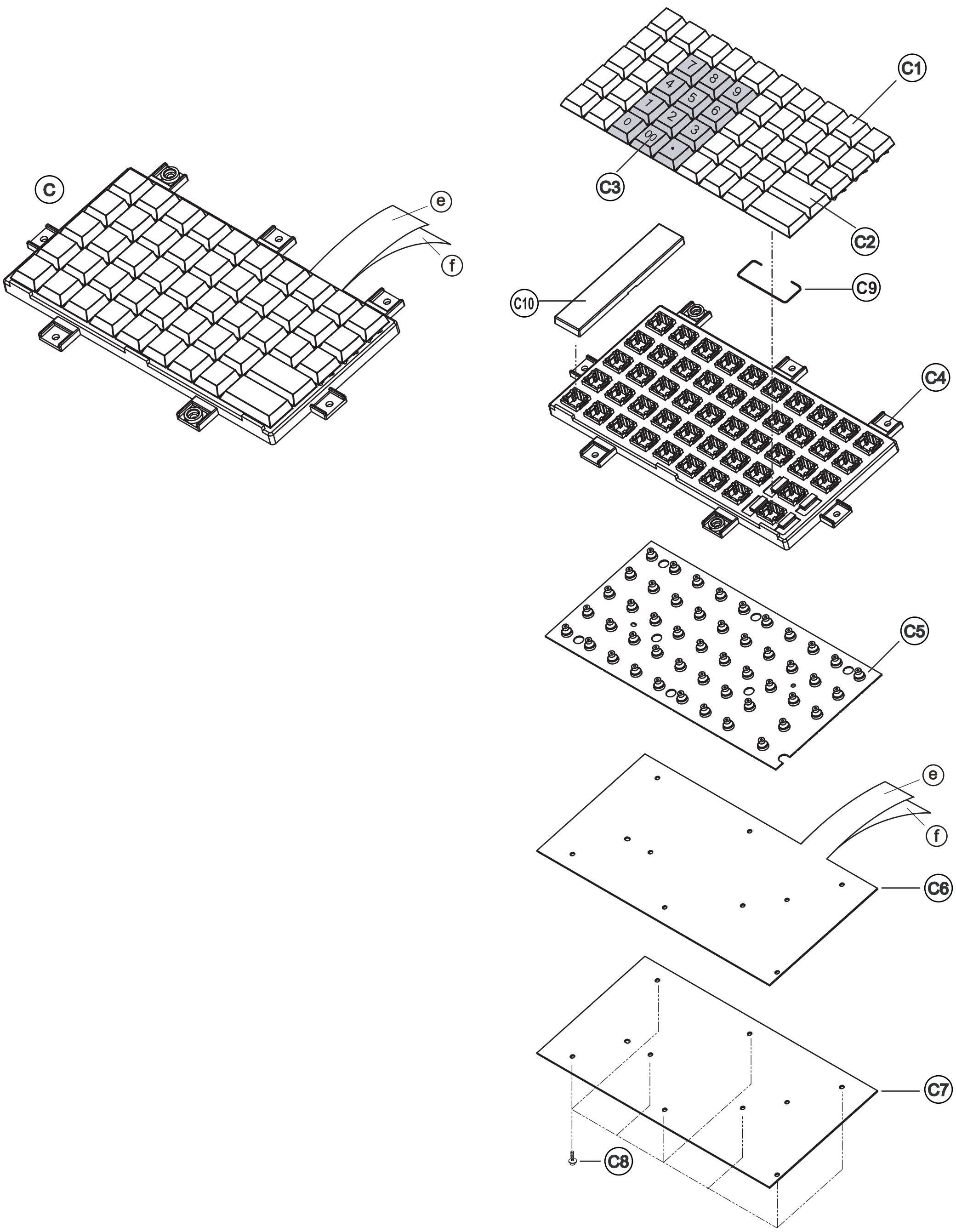


Figure 5-6 ASS'Y KEYBOARD (LASER PRINTING TYPE)

C. ASS’Y KEYBOARD (LASER PRINTING TYPE)

No.	Code No.	Description/ Specification	Q`ty	Design-Location	Serviceable	Remark
C	JK59-30041A	UNIT-KEYBOARD: ER-180T(STD)	1		Y	
C1	JK81-20085A	PMO-KEY TOP 1×1	34		Y	
C2	JK81-20086A	PMO-KEY TOP 1×2	2		Y	
C3	JK81-20094A	PMO-KEY TOP SET:0~9	1		Y	
C4	JK81-20084A	PMO-KEYBOARD FRAME	1		Y	
C5	JK81-20092A	REX-CONTACT RUBBER	1		Y	
C6	JK81-20083A	ASSY-FPC,230	1		Y	
C7	JK81-20091A	IPR-BOTTOM PLATE	1		Y	
C8	JK81-20076A	SCREW TAPPING(BH):M2X5	8		Y	
C9	JK81-20095A	BALANCE-BAR	2		Y	
C10	JK72-20390A	PMO-BLANK KEY TOP	1		Y	

C. ASS'Y KEYBOARD (LABEL TYPE)

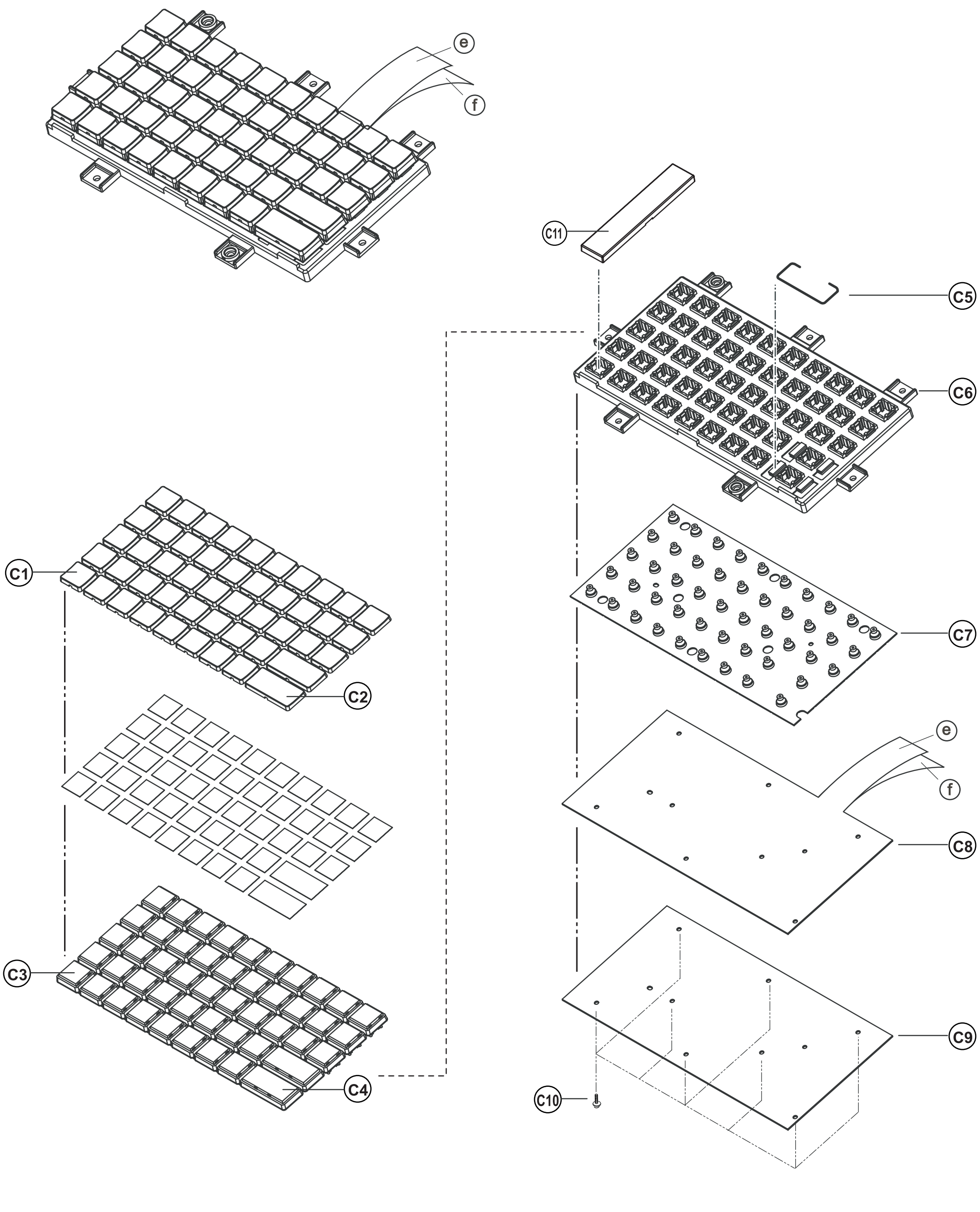


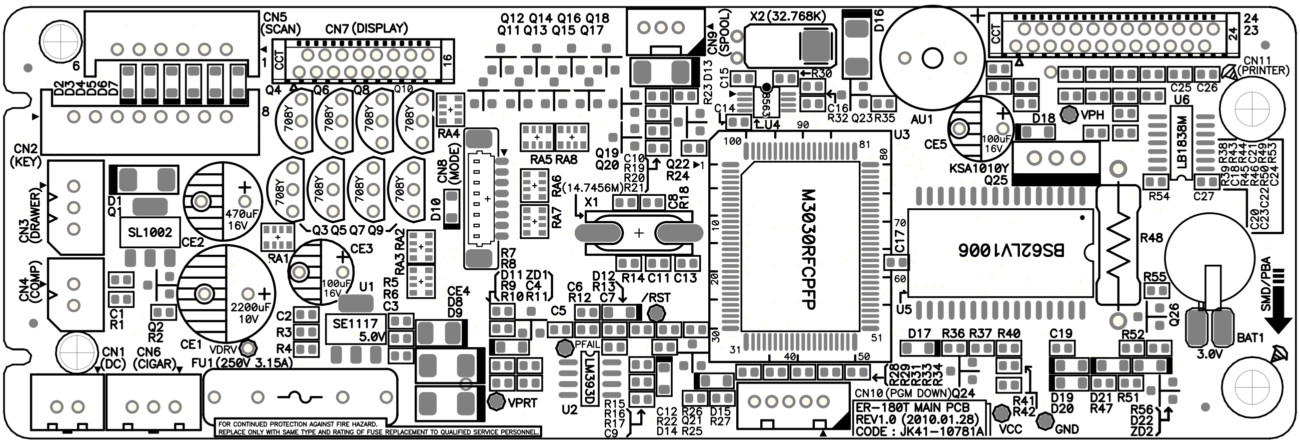
Figure 5-7 ASS'Y KEYBOARD (LABEL TYPE)

C. ASS'Y KEYBOARD (LABEL TYPE)

No.	Code No.	Description/ Specification	Q`ty	Design-Location	Serviceable	Remark
C	JK59-30043A	UNIT-KEYBOARD: ER-180T(STD)	1		Y	
C1	JK81-20089A	PMO-KEY TOP 1×1	46		Y	
C2	JK81-20090A	PMO-KEY TOP 1×2	2		Y	
C3	JK81-20087A	PMO-KEY CAP 1×1	46		Y	
C4	JK81-20089A	PMO-KEY CAP 1×2	2		Y	
C5	JK81-20095A	BALANCE-BAR	2		Y	
C6	JK81-20084A	PMO-KEYBOARD FRAME	1		Y	
C7	JK81-20092A	REX-CONTACT RUBBER	1		Y	
C8	JK81-20083A	ASSY-FPC,230	1		Y	
C9	JK81-20091A	IPR-BOTTOM PLATE	1		Y	
C10	JK81-20076A	SCREW TAPPING(BH):M2X5	8		Y	
C11	JK72-20390A	PMO-BLANK KEY TOP	1		Y	

6 PCB Layout and Parts List

6-1 MAIN PCB



No	Part-No	Description / Specification	Q'TY	Design Location	Serviceable	Remarks
-	**JK92-01646A**	**PBA MAIN-BOARD:ER-180T,STD**	**1**	**ASSY**	**Y**	
-	0501-000294	TR-SMALL SIGNAL:KSA708Y,PNP,800mW,TO-92	8	Q3-Q10	Y	
-	0502-000234	TR-POWER:KSA1010Y,PNP,40W,TO-220,100-200	1	Q25	Y	
-	2003-000327	R-METAL OXIDE:51ohm,5%,2W,5.4*14.7mm,	1	R48	Y	
-	2401-000042	C-AL:100uF,16V,RADIAL,φ6.3*7L,RoHS	1	CE3	Y	
-	2401-000700	C-AL:2200uF,20%,10V,RADIAL,φ10*20L	1	CE1	Y	
-	2801-003376	CRYSTAL-UNIT:32.768KHz,20ppm,28-AAY,12	1	X2	Y	
-	3002-001027	BUZZER-PIEZO:85dB,1.5V,24mA,2.048KHz,BK	1	AU1	Y	
-	3601-000261	FUSE-CARTRIDGE:250V,3.15A,TIME-LAG,GLASS	1	FU1	Y	
-	3602-000001	FUSE-CLIP:-,-,30mohm	2	FU1	Y	
-	3708-000306	CONNECTOR-FFC:6P,1R,2.54mm,ST,BLACK	1	CN5	Y	
-	3708-000327	CONNECTOR-FFC:8P,1R,2.54mm,ST,BLACK	1	CN2	Y	
-	3708-001418	CONNECTOR-FFC:16P,1mm,ST,DIP,TOP,IVORY	1	CN7	Y	
-	3708-001419	CONNECTOR-FFC:24P,1mm,ST,DIP,TOP,IVOR,	1	CN11	Y	
-	3711-003968	CONNECTOR-HEADER:BOX,3P,1R,2.5mm,ST	1	CN3	Y	
-	3711-003969	CONNECTOR-HEADER:BOX,2P,1R,2.5mm,ST	1	CN4	Y	
-	3711-003409	CONNECTOR-HEADER:BOX,3P,1R,2mm,ST	1	CN9	Y	
-	3711-003420	CONNECTOR-HEADER:BOX,5P,1R,2mm,ST	1	CN10	Y	
-	3711-004100	WAFER;BOX-HEADER,1R,2P,2.5mm,ST,WHITE	1	CN1	Y	
-	3711-004104	WAFER;BOX-HEADER,1R,3P,2.5mm,ST,WHITE	1	CN6	Y	

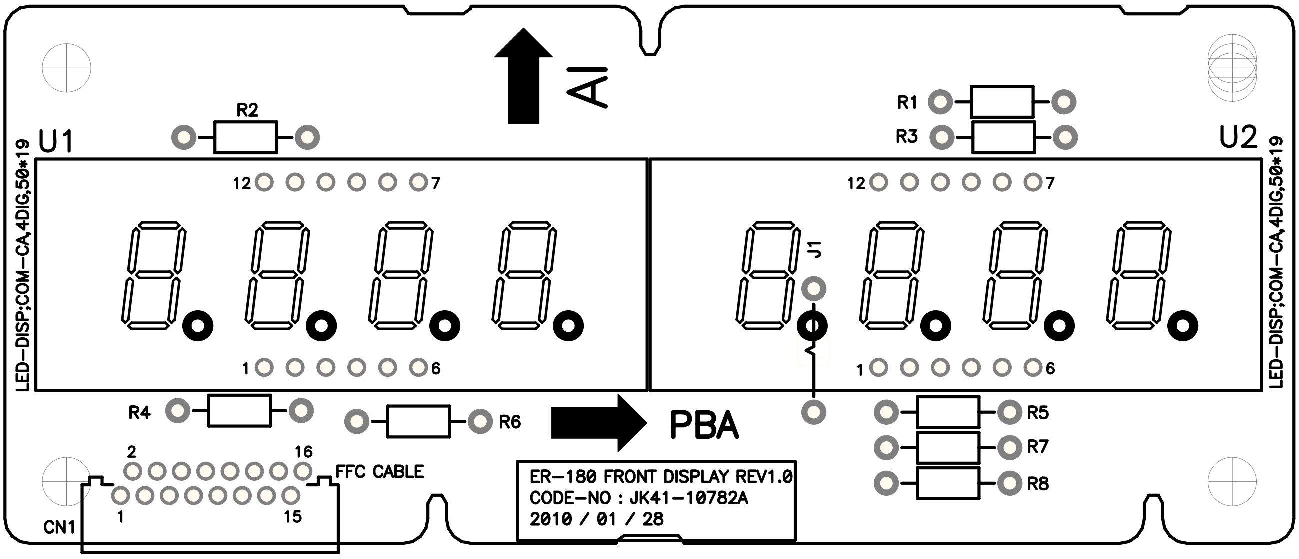
6-1 MAIN PCB

No	Part-No	Description / Specification	Q'TY	Design Location	Serviceable	Remarks
-	4301-000121	BATTERY:3.0V,11mAh,MS920S-FL27E	1	BAT1	Y	
-	0402-001189	DIODE-RECTIFIER:S1G-E3,M4,400V	3	D1,D13,D16	Y	
-	0403-000757	DIODE-ZENER:BZX84C3V3F,3.3V,300mW,SOT-23	1	ZD1	Y	
-	0404-001051	DIODE-SCHOTTKY:SK14,40V,1A,DO-214AA,	2	D8,D9	Y	
-	0404-001052	DIODE-SCHOTTKY:BAT43WS,BAT54WS,30V	16	D2-D7,D10-D12, D14,D15,D17-D21	Y	
-	0501-000279	TR-SMALL SIGNAL:KSA1182Y,PNP,150mW,SOT23	3	Q19,Q20,Q21	Y	
-	0501-000457	TR-SMALL SIGNAL:MMBT2222A,NPN,350MW,SOT	13	Q2,Q11-Q18,Q22-Q24,Q26	Y	
-	0502-000400	TR-POWER;SL1002,NPN,3A,10W,SOT-23	1	Q1	Y	
-	0903-001174	IC-CPU;M3030RFCPFP,16BIT,QFP,100P	1	U3	Y	
-	0909-000138	IC-REAL TIME CLOCK:PCF8563,I2C,TSSOP,8P	1	U4	Y	
-	1003-001234	IC-MOTOR DRIVER:LB1838M,SOP,14P,225MIL	1	U6	Y	
-	1106-000132	IC-SRAM:BS62LV1027SCP,128Kx8BIT,SOP,32P	1	U5	Y	
-	1202-000164	IC-VOLTAGE COMPARATOR:KA393,SOP,8P,1.27	1	U2	Y	
-	1203-001774	IC-REGULATOR;SE1117-5.0V,SOT-223,4P	1	U1	Y	
-	2008-000008	R-CHIP:100 OHM,5%,1/10W,1608	2	R14,R56	N	
-	2008-000012	R-CHIP:200 OHM,5%,1/10W,1608	3	R18,R38,R39	N	
-	2008-000020	R-CHIP:470 OHM,5%,1/10W,1608	2	R7,R47	N	
-	2008-000026	R-CHIP:1KOHM,1%,1/10W,1608,1%	8	R3,R4,R19,R20,R36,R51, R53,R55	N	
-	2008-000030	R-CHIP:2KOHM,5%,1/10W,1608	4	R5,R6,R9R10	N	
-	2008-000037	R-CHIP:4.7KOHM,1%,1/10W,1608,1%	9	R2,R23,R24,R25,R30,R32, R35,R40,R43	N	
-	2008-000041	R-CHIP:6.8KOHM,1%,1/10W,1608,1%	1	R16	N	
-	2008-000044	R-CHIP:10KOHM,1%,1/10W,1608,1%	20	R1,R8,R12,R13,R15,R22, R26-R29,R31,R33,R34, R37,R41,R42,R44,R45, R49,R54	N	
-	2008-000046	R-CHIP:15KOHM,5%,1/10W,1608	2	R11,R46	N	
-	2008-000063	R-CHIP:100KOHM,5%,1/10W,1608	1	R17	N	
-	2008-000065	R-CHIP:150KOHM,1%,1/10W,1608,1%	1	R50	N	
-	2011-001099	R-NETWORK;1KOHM,5%,1/16W,L,CH	2	RA2,RA3	Y	
-	2011-001100	R-NETWORK;4.7KOHM,5%,1/16W,L,CH	2	RA5,RA8	Y	
-	2011-001101	R-NETWORK;10KOHM,5%,1/16W,L,CH	4	RA1,RA4,RA6,RA7	Y	
-	2204-000003	C-CERAMIC,CHIP:15pF,5%,50V,1608	1	C15	N	
-	2204-000004	C-CERAMIC,CHIP:22pF,5%,50V,1608	2	C8,C13	N	

6-1 MAIN PCB

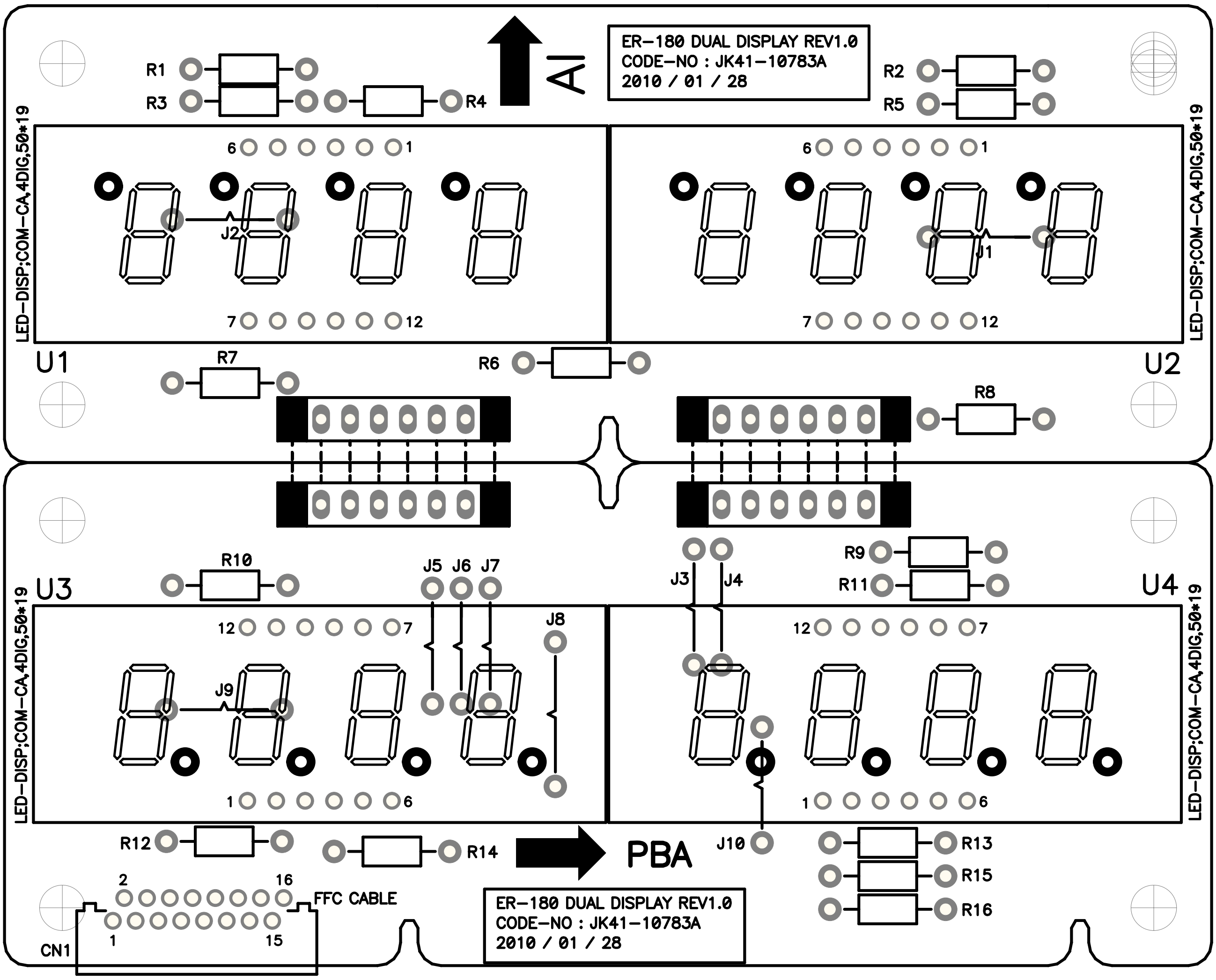
No	Part-No	Description / Specification	Q'TY	Design Location	Serviceable	Remarks
-	2204-000010	C-CERAMIC,CHIP:100pF,5%,50V,1608	3	C10,C25,C26	N	
-	2204-000028	C-CERAMIC,CHIP:100nF,+80-20%,25V,Y5V,160	19	C1-C7,C11,C14, C16-C24,C27	N	
-	2204-000029	C-CERAMIC,CHIP:1uF,+80-20%,16V,Y5V,1608	2	C9,C12	N	
-	2205-000002	C-TANTAL:10uF,16V,3528	1	CE4	Y	
-	2801-003382	CRYSTAL-SMD:14.7456MHZ,SX-1,18pF	1	X1	Y	
-	3711-004123	WAFER;BOX-HEADER,1R, 8P,1.25mm,SMD	1	CN8	Y	
-	JK41-10781A	PCB-MAIN:ER-180T,FR-4,2L,T1.6	1	PCB	N	

6-2 FRONT DISPLAY PCB



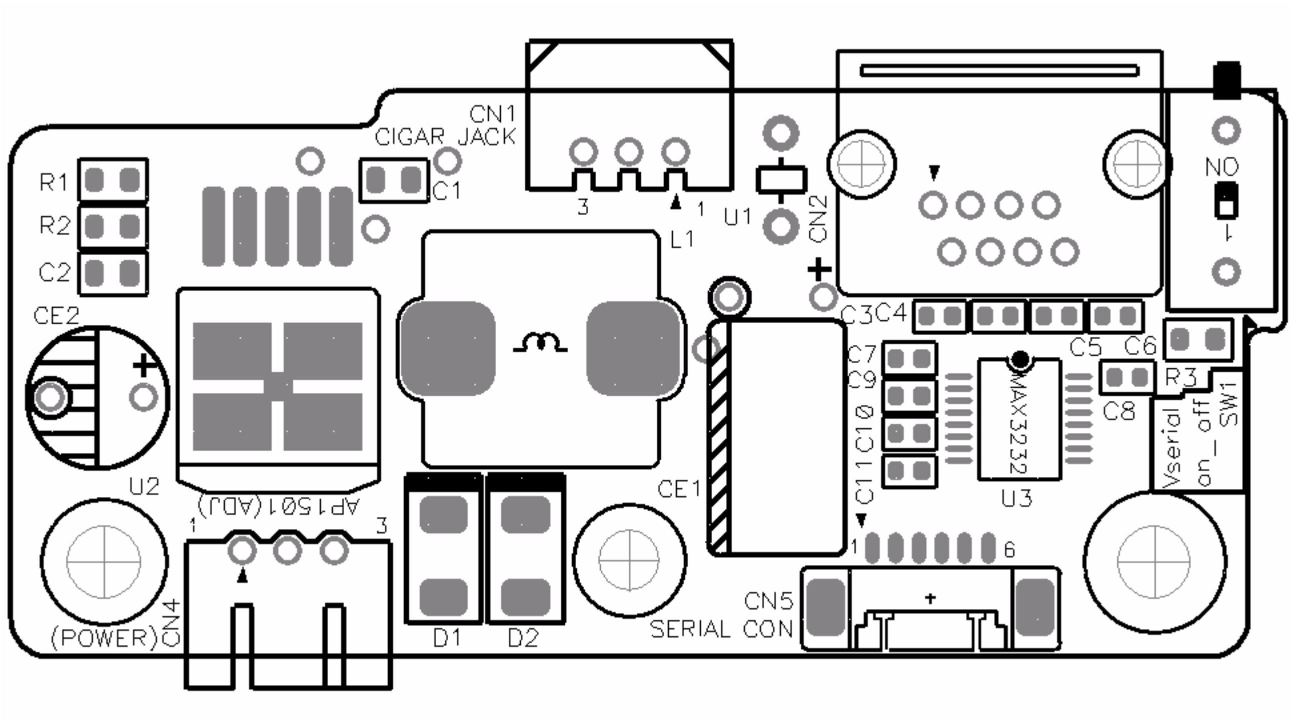
No	Part-No	Description / Specification	Q'TY	Design Location	Serviceable	Remarks
-	**JK92-01648A**	**PBA-DISPLAY:ER-180,FRONT**	**1**	**ASSY**	**Y**	
-	3708-001417	CONNECTOR-FFC:16P,1mm,AN,DIP,UPSIDE,IVR,	1	CN1	Y	
-	JK07-00018A	DISPLAY-FND:ER180,FND*4,12PIN,Y/G	2	U1,U2	Y	
-	2001-000027	R-CARBON:100OHM,5%,1/4W,AA,TP,2.4X6.0MM	8	R1-R8	Y	
-	JC39-40511A	CBF HARNESS:ML-80,JUMPER,AWG22,52mm,SILV	1	J1	Y	
-	JK41-10782A	PCB-DISPLAY:ER-180,FRONT,FR-1,T1.6	1	PCB	N	

6-3 DUAL DISPLAY PCB



No	Part-No	Description / Specification	Q'TY	Design Location	Serviceable	Remarks
-	**JK92-01647A**	**PBA-DISPLAY:ER-180,DUAL**	**1**	**ASSY**	**Y**	
-	3708-001417	CONNECTOR-FFC:16P,1mm,AN,DIP,UPSIDE,IVR,	1	CN1	Y	
-	JK07-00018A	DISPLAY-FND:ER180,FND*4,12PIN,Y/G	4	U1-U4	Y	
-	JK39-40804A	HARNESS-JUMP WIRE:ER180,80mm,8P,DISPLAY	2	DISPLAY HAR.	Y	
-	2001-000027	R-CARBON:100OHM,5%,1/4W,AA,TP,2.4X6.0MM	16	R1-R16	Y	
-	JC39-40511A	CBF HARNESS:ML-80,JUMPER,AWG22,52mm,SILV	10	J1-J10	Y	
-	JK41-10783A	PCB-DISPLAY:ER-180,DUAL,FR-1,T1.6	1	PCB	N	

6-4 CIGAR-JACK PCB

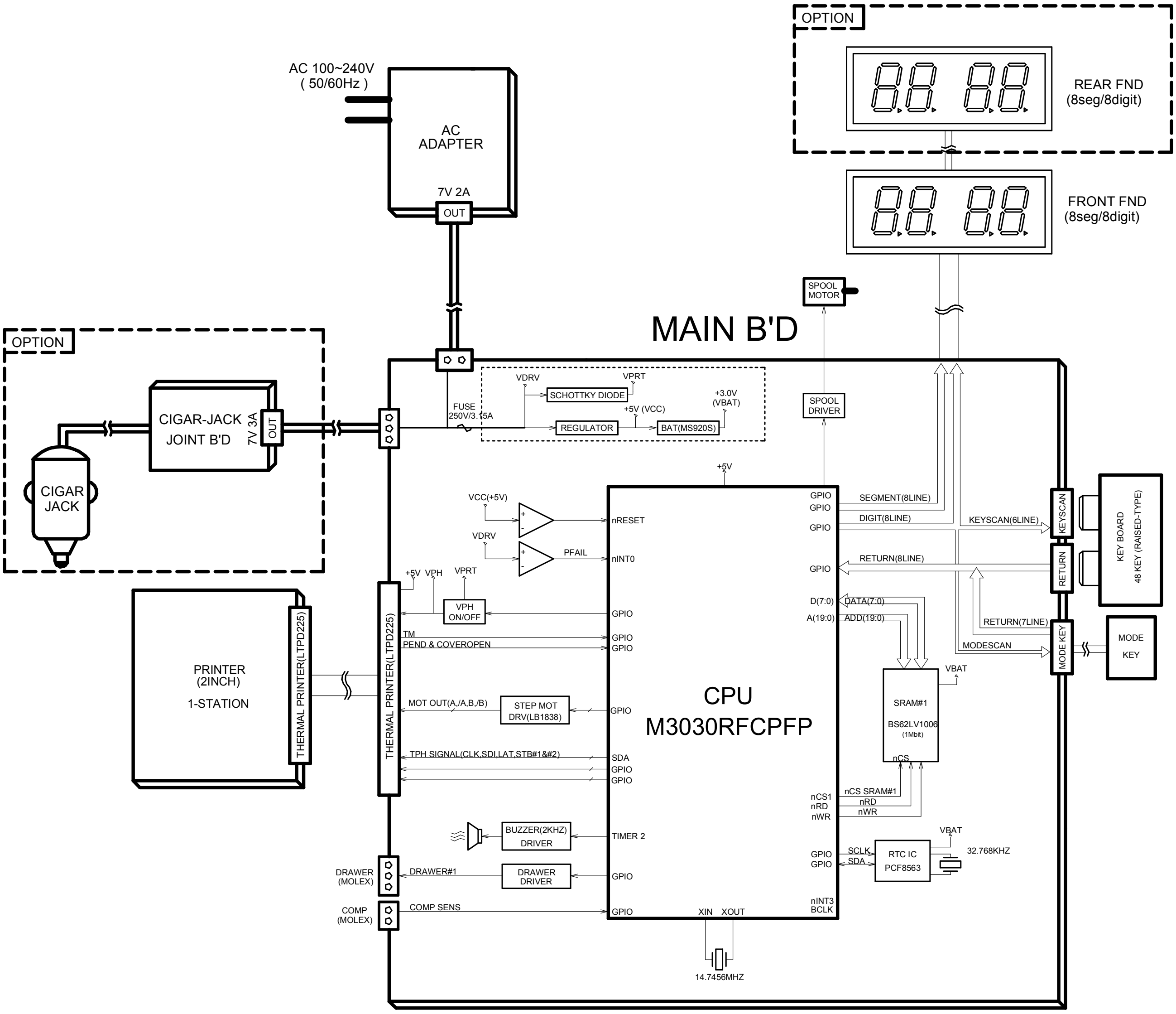


No	Part-No	Description / Specification	Q'TY	Design Location	Serviceable	Remarks
-	**JK92-01649A**	**PBA-CIGARJACK:ER-180,OPTION**	**1**	**ASSY**	**Y**	
-	2401-000032	C-AL:100uF,50V,RADIAL,φ8*11.5L,RoHS	1	CE1	Y	
-	2401-000042	C-AL:100uF,16V,RADIAL,φ6.3*7L,RoHS	1	CE2	Y	
-	3603-000004	POLY-SW;RUEF160,30V,1.6A,DIP,RADIAL	1	U1	Y	
-	3711-000823	CONNECTOR-HEADER:BOX,3P,1R,2.5mm,ANGLE	1	CN1	Y	
-	3711-004099	WAFER;BOX-HEADER,1R,3P,2.5mm,AN,WHITE,	1	CN4	Y	
-	JK39-40805A	HARNESS-CIGA JACK:ER180,3P,140mm	1		Y	
-	0404-001051	DIODE-SCHOTTKY:SK14,40V,1A,DO-214AA,	2	D1,D2	Y	
-	1203-001776	IC-REGULATOR:AP1501-K5L,TO263-5L,SMD,ADJ	1	U2	Y	
-	2007-000297	R-CHIP:10KOHM,1%,1/8W,DA,TP,2012	1	R2	N	
-	2007-000671	R-CHIP:2KOHM,5%,1/8W,DA,TP,2012	1	R1	N	
-	2203-000192	C-CERAMIC,CHIP:100nF,+80-20%,50V,Y5V,TP,	1	C1,C2	Y	
-	JK27-60102A	L-COIL:BDS-1055R,33uH,SMD,IND-330M-SM-12	1	L1	Y	
-	JK41-10784A	PCB-CIGAR JACK:ER-180,FR-4,2L,T1.6	1	PCB	N	

Memo

7 Block Diagram

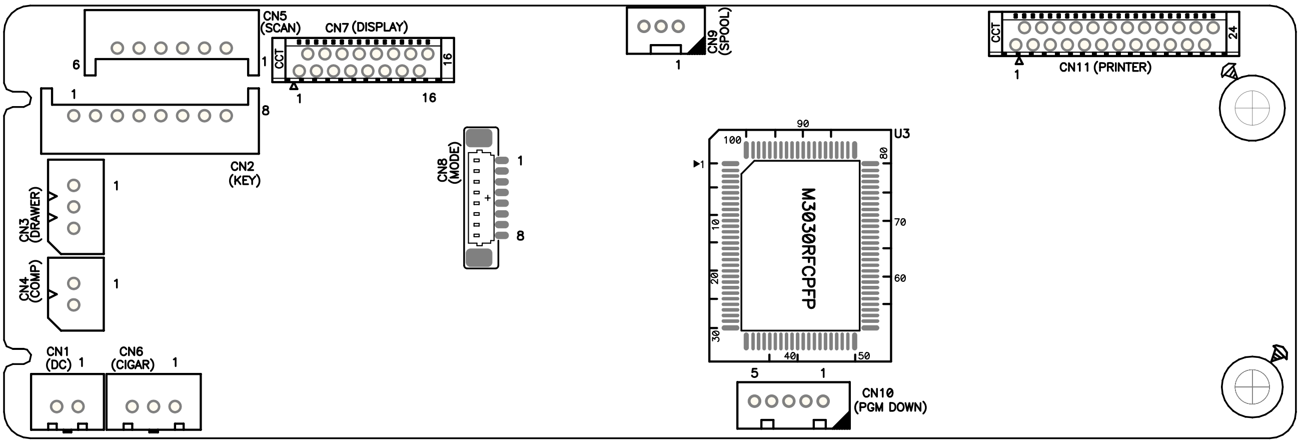
7-1 Block Diagram



Memo

8 Wiring Diagram

8-1 Main PCB



CN1 (DC-JACK)

Pin No	Signal Name	Pin No	Signal Name	Pin No	Signal Name
1	GND	2	DC	-	-

CN2 (KEY RETURN)

Pin No	Signal Name	Pin No	Signal Name	Pin No	Signal Name
1	RETURN #1	4	RETURN #4	7	RETURN #7
2	RETURN #2	5	RETURN #5	8	RETURN #8
3	RETURN #3	6	RETURN #6	-	-

CN3 (DRAWER)

Pin No	Signal Name	Pin No	Signal Name	Pin No	Signal Name
1	VDRV	2	GND	3	N.C

CN4 (DRAWER COMP.)

Pin No	Signal Name	Pin No	Signal Name	Pin No	Signal Name
1	SEN_DWRCOMP	2	GND	-	-

CN5 (KEYSCAN)

Pin No	Signal Name	Pin No	Signal Name	Pin No	Signal Name
1	KEYSCAN #2	3	KEYSCAN #6	5	KEYSCAN #4
2	KEYSCAN #5	4	KEYSCAN #7	6	KEYSCAN #8

8-1 Main PCB

CN6 (CIGAR-JACK)

Pin No	Signal Name	Pin No	Signal Name	Pin No	Signal Name
1	GND	2	N.C	3	DC

CN7 (DISPLAY)

Pin No	Signal Name	Pin No	Signal Name	Pin No	Signal Name
1	DIG #8	7	DIG #6	13	DIG #2
2	SEG #8	8	SEG #6	14	SEG #7
3	DIG #4	9	DIG #5	15	DIG #3
4	SEG #4	10	SEG #2	16	SEG #1
5	DIG #7	11	DIG #1	-	-
6	SEG #5	12	SEG #3	-	-

CN8 (MODE KEY)

Pin No	Signal Name	Pin No	Signal Name	Pin No	Signal Name
1	MODESCAN	4	RETURN #6	7	RETURN #3
2	RETURN #8	5	RETURN #5	8	RETURN #2
3	RETURN #7	6	RETURN #4	-	-

CN9 (SPOOL)

Pin No	Signal Name	Pin No	Signal Name	Pin No	Signal Name
1	SOLENOID(+)	2	N.C	3	SOLENOID(-)

CN10 (PGM DOWNLOAD)

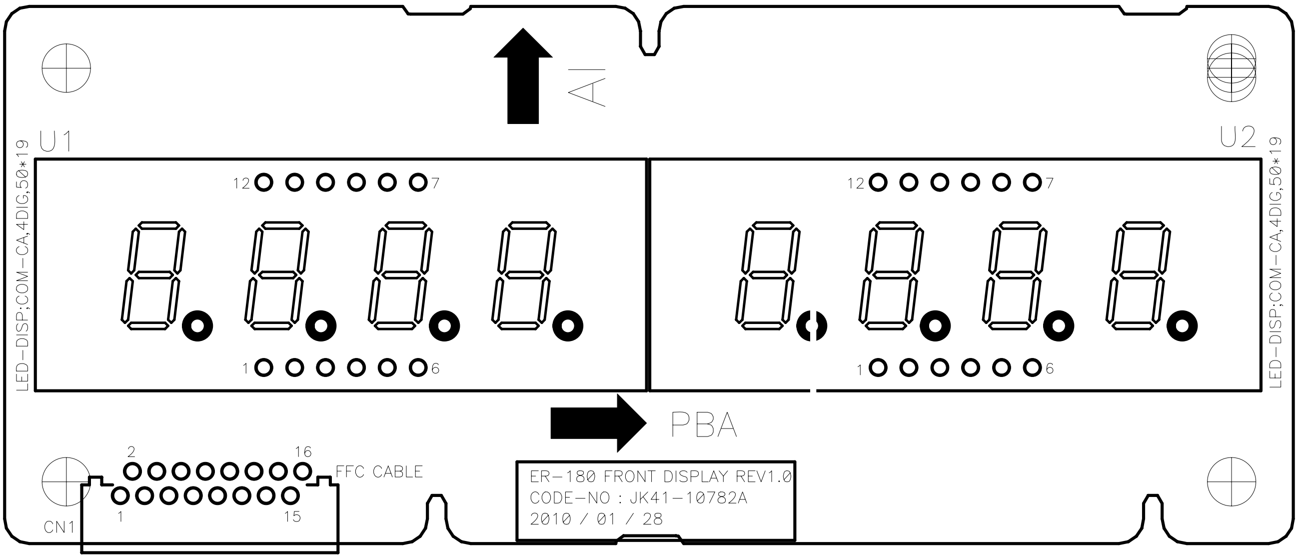
Pin No	Signal Name	Pin No	Signal Name	Pin No	Signal Name
1	VCC(+5V)	3	TXD1	5	GND
2	RXD1	4	FDT_D/N	-	-

8-1 Main PCB

CN11 (PRINTER)

Pin No	Signal Name	Pin No	Signal Name	Pin No	Signal Name
1	SENS1(SEN_COPEN&PEND)	9	TPH_STB#2	17	TPH_STB#1
2	SENS2(GND)	10	GND	18	TPH_STB#1
3	VPH	11	GND	19	VPH
4	VPH	12	TPH_STB#2	20	VPH
5	TPH_DATA	13	VDD	21	MOT_/A
6	TPH_LAT	14	THERMISTER IN	22	MOT_A
7	TPH_CLK	15	GND	23	MOT_B
8	VDD	16	PRT DISCON(GND)	24	MOT_/B

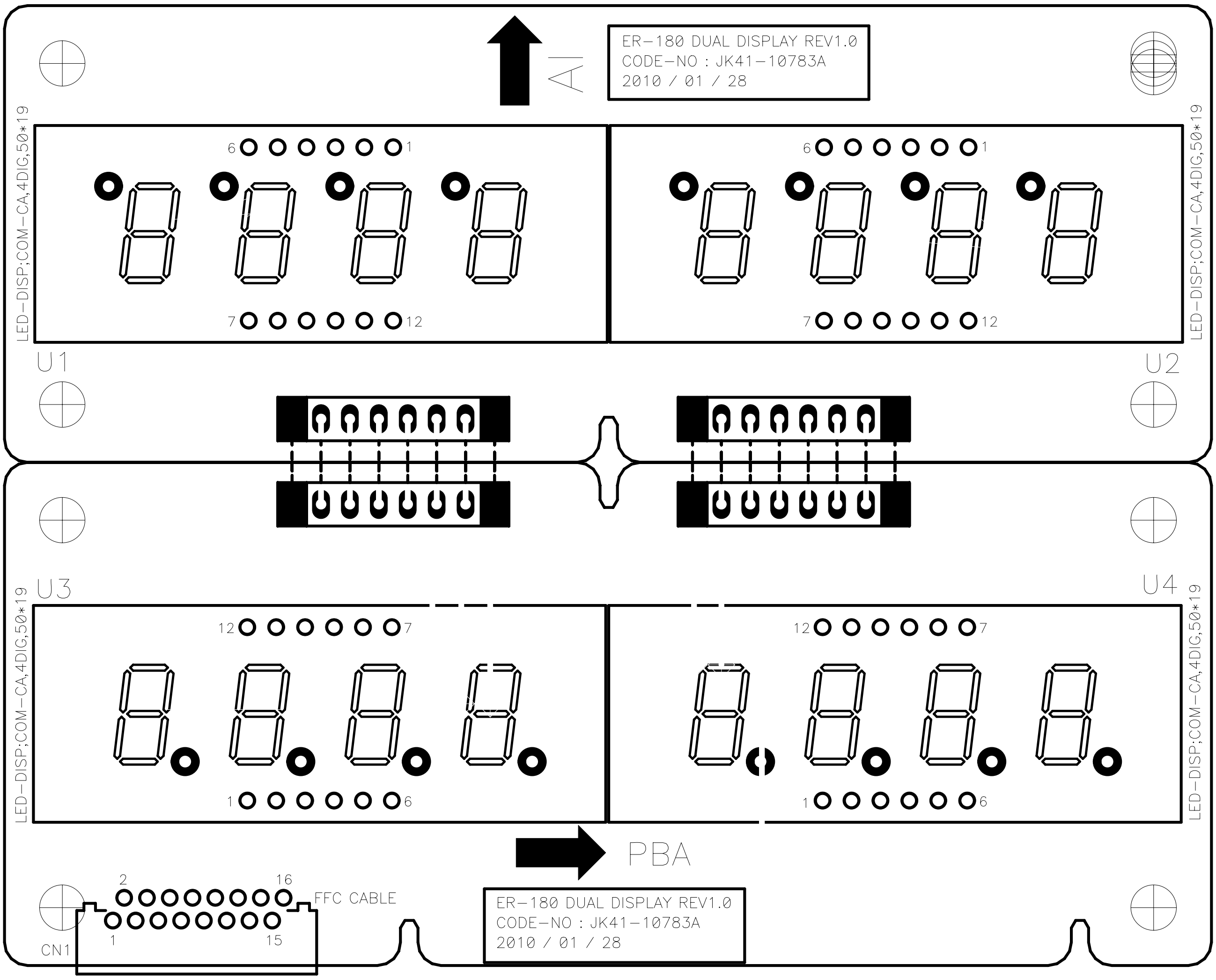
8-2 FRONT DISPLAY PCB



CN1 (DISPLAY)

Pin No	Signal Name	Pin No	Signal Name	Pin No	Signal Name
1	VFD_SEG#1(A)	7	VFD_SEG#2(B)	13	VFD_SEG#4(D)
2	VFD_GRD#3	8	VFD_GRD#5	14	VFD_GRD#4
3	VFD_SEG#7(G)	9	VFD_SEG#6(F)	15	VFD_SEG#8(DP)
4	VFD_GRD#2	10	VFD_GRD#6	16	VFD_GRD#8
5	VFD_SEG#3(C)	11	VFD_SEG#5(E)		
6	VFD_GRD#1	12	VFD_GRD#7		

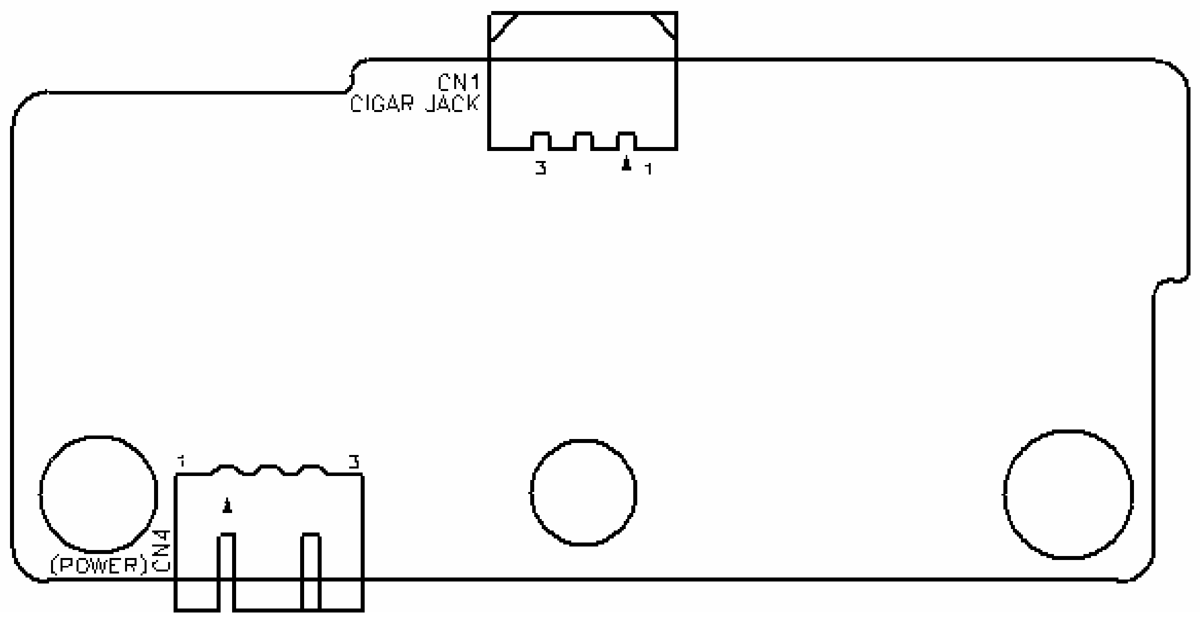
8-3 DUAL DISPLAY PCB



CN1 (DISPLAY)

Pin No	Signal Name	Pin No	Signal Name	Pin No	Signal Name
1	VFD_SEG#1(A)	7	VFD_SEG#2(B)	13	VFD_SEG#4(D)
2	VFD_GRD#3	8	VFD_GRD#5	14	VFD_GRD#4
3	VFD_SEG#7(G)	9	VFD_SEG#6(F)	15	VFD_SEG#8(DP)
4	VFD_GRD#2	10	VFD_GRD#6	16	VFD_GRD#8
5	VFD_SEG#3(C)	11	VFD_SEG#5(E)		
6	VFD_GRD#1	12	VFD_GRD#7		

8-4 CIGAR-JACK PCB



CN1 (CIGAR-JACK)

Pin No	Signal Name	Pin No	Signal Name	Pin No	Signal Name
1	12V(CIGAR)	2	GND	3	GND

CN4 (CIGAR-JACK)

Pin No	Signal Name	Pin No	Signal Name	Pin No	Signal Name
1	VDRV(7.5V)	2	GND	3	GND

Memo

9 Schematic Diagram

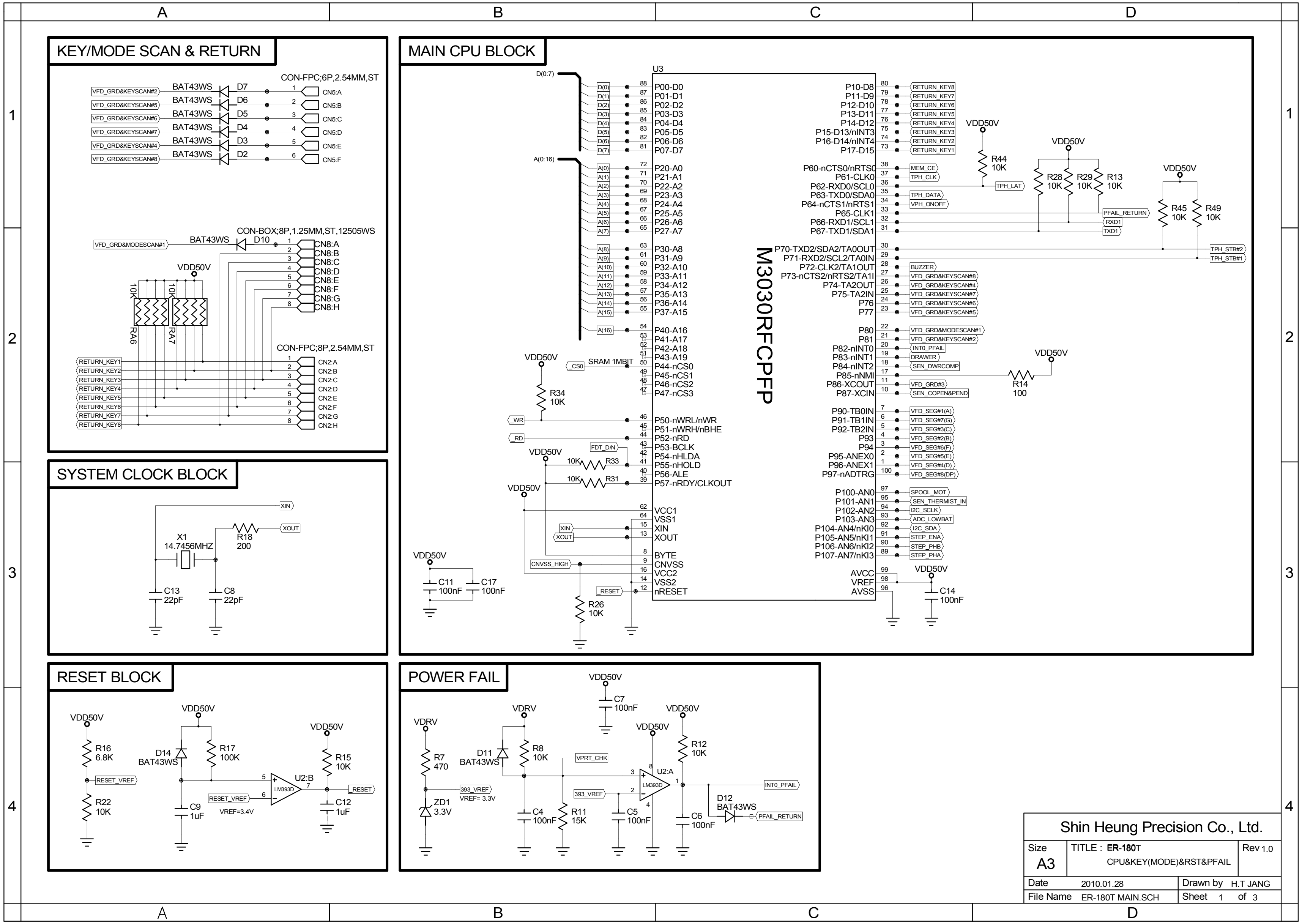
[Schematics Sheet Content]

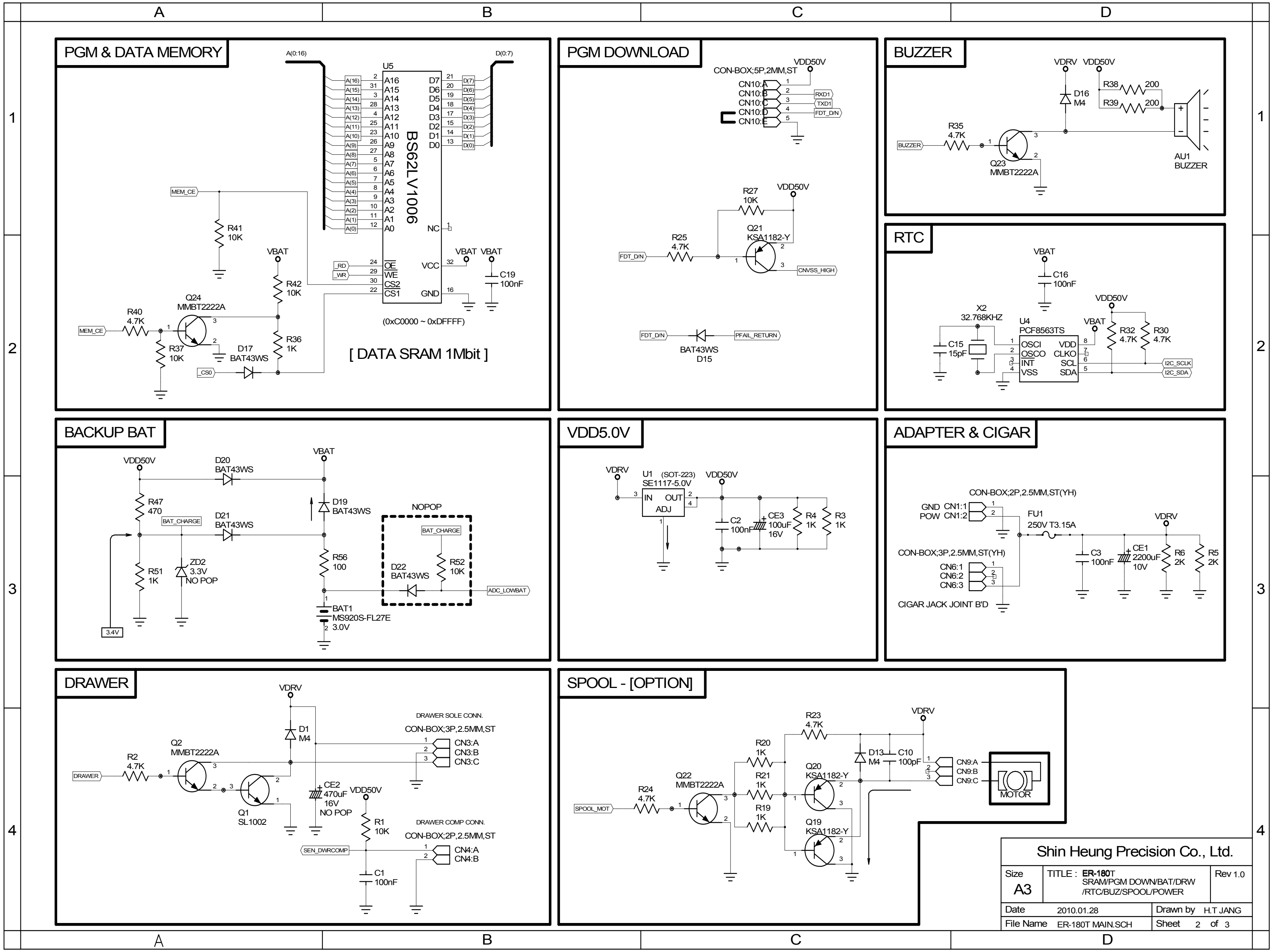
1. MAIN PCB Schematics.

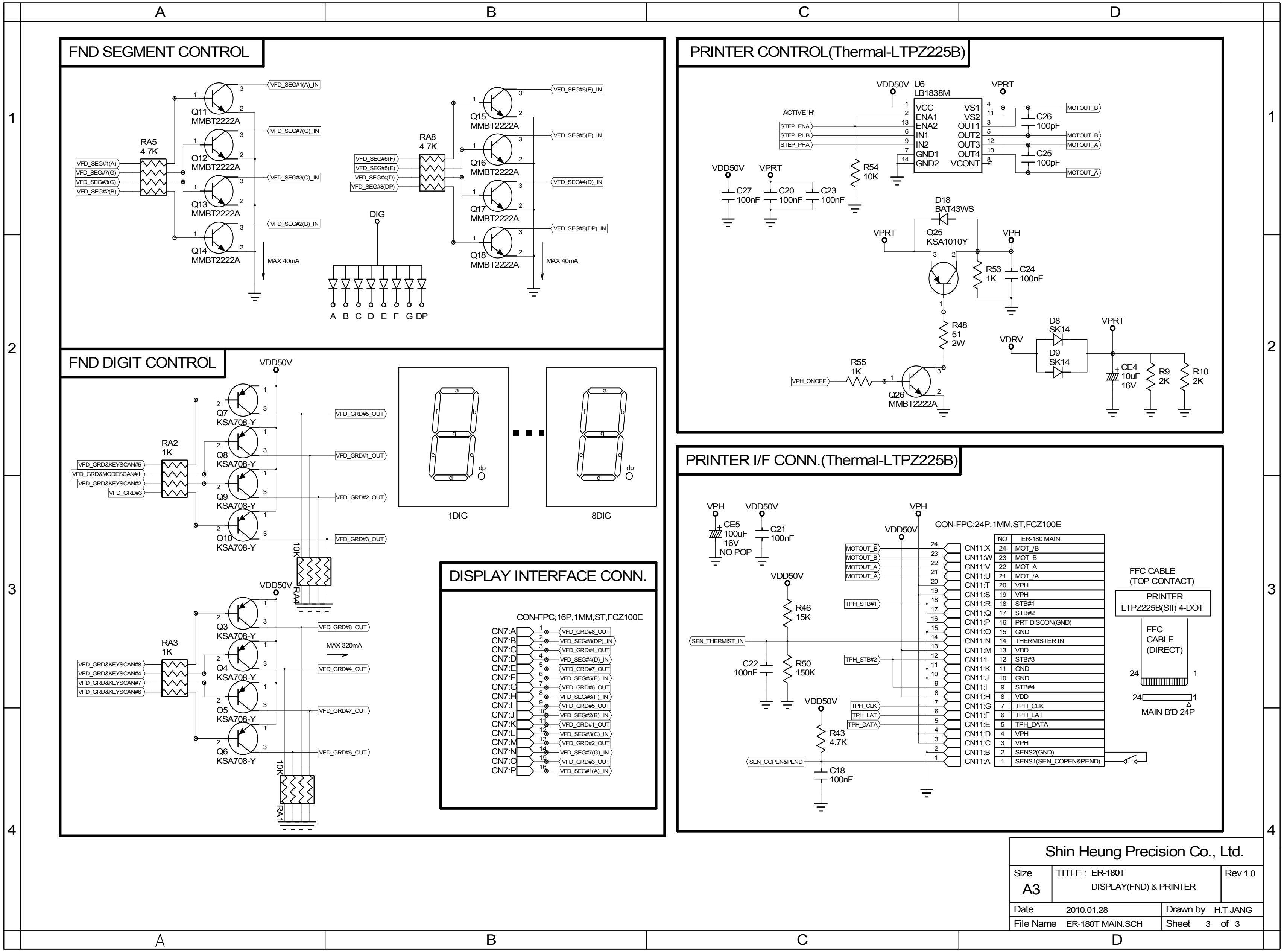
2. FRONT DISPLAY PCB Schematics.

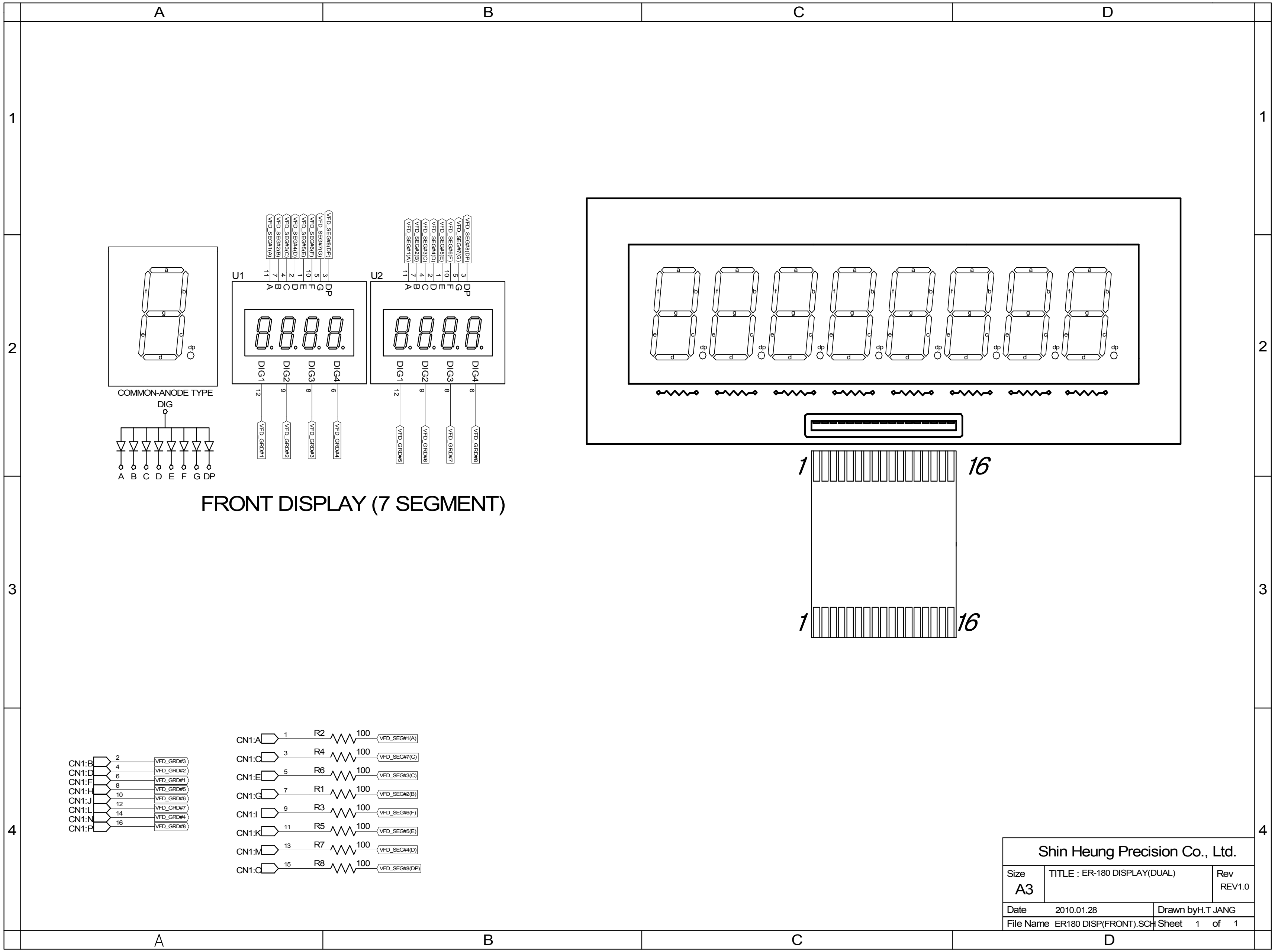
3. DUAL DISPLAY PCB Schematics.

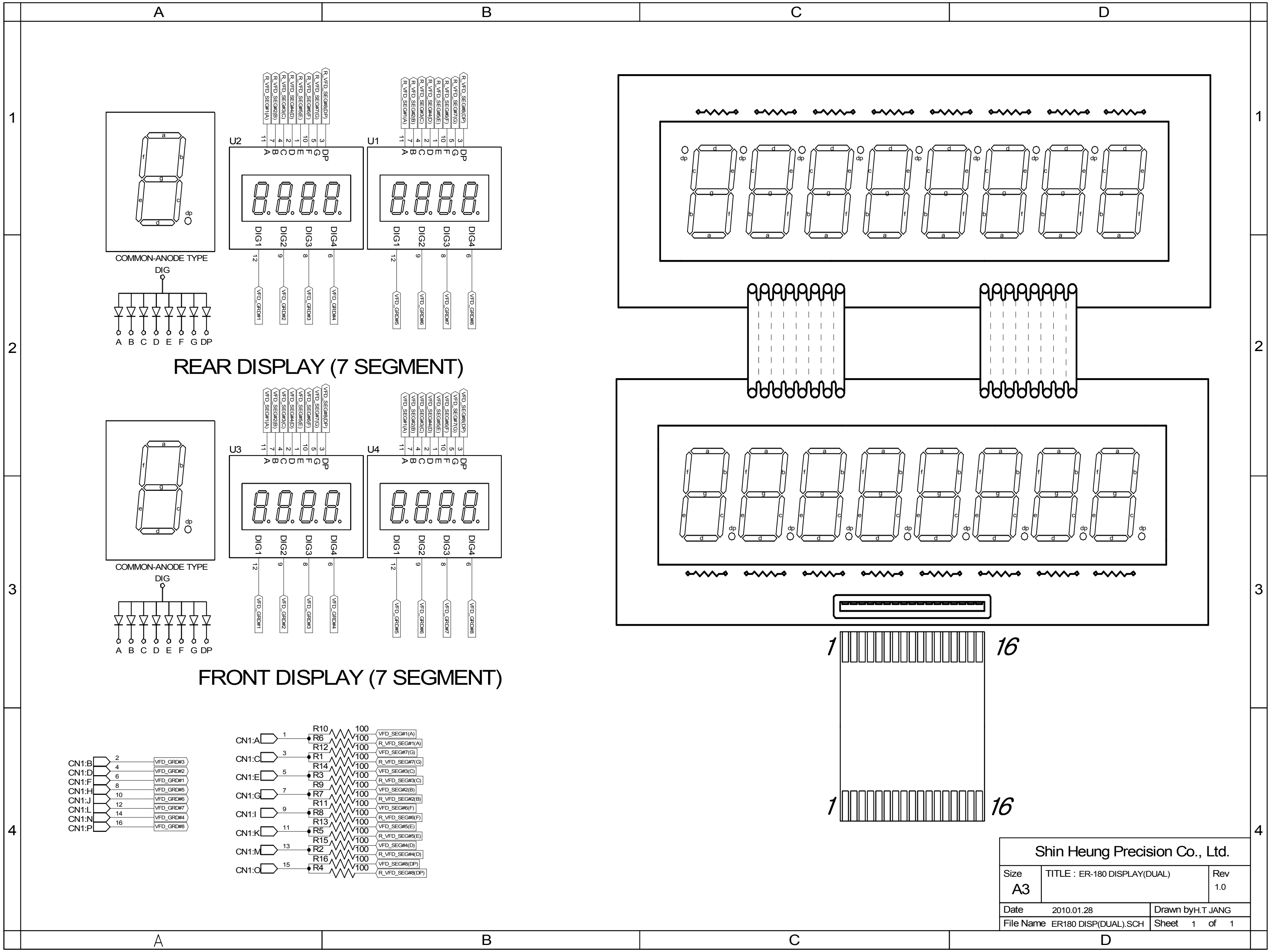
4. CIGAR-JACK POWER PCB Schematics.

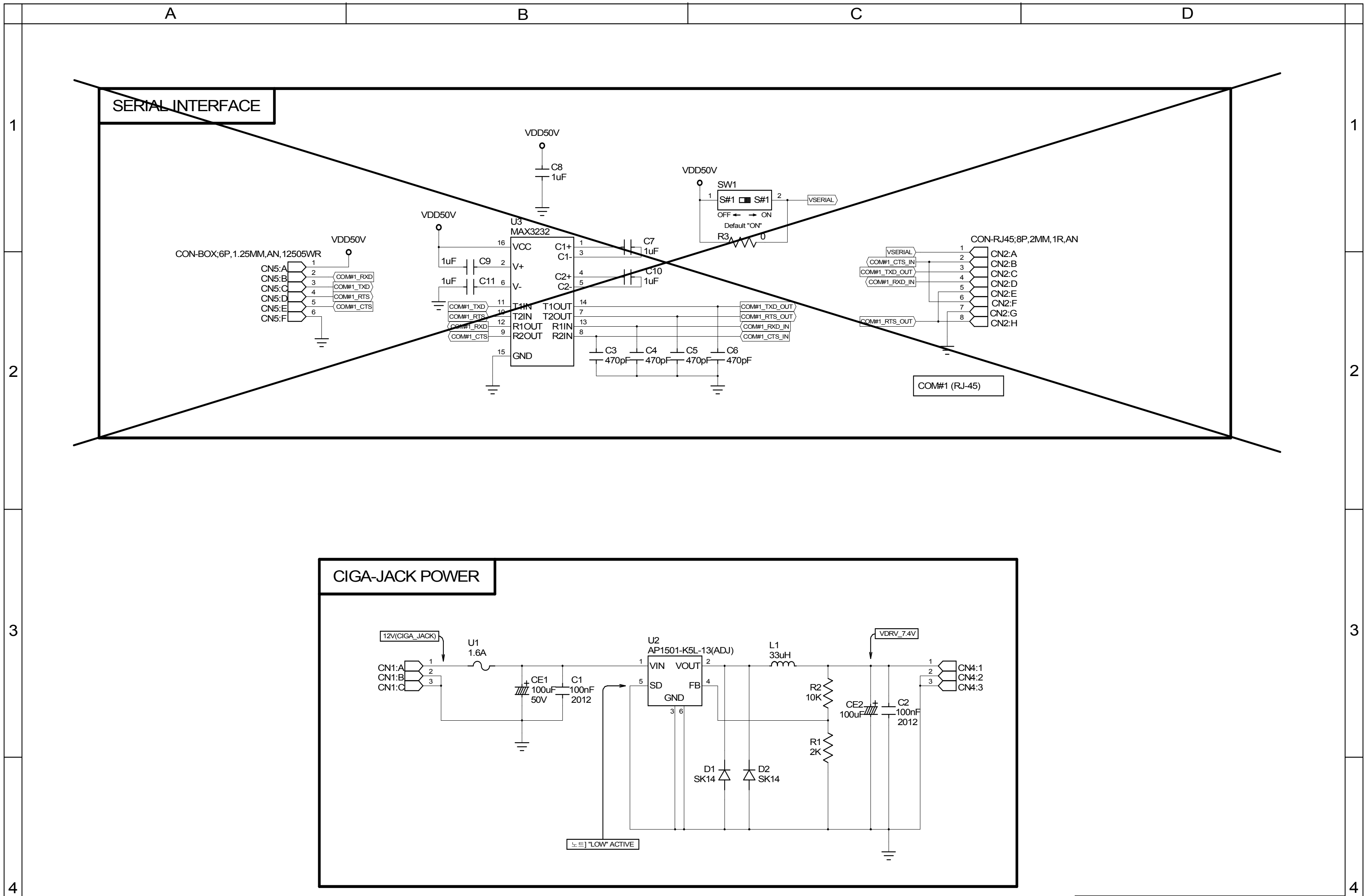

KEY/MODE SCAN & RETURN
CON-FPC;6P,2.54MM,ST
BAT43WS
D7
D6
D5
D4
D3
D2
CON-BOX;8P,1.25MM,ST,12505WS
D10
VDD50V
RA6
RA7
CON-FPC;8P,2.54MM,ST
MAIN CPU BLOCK
U3
M3030RFCPFP
SRAM 1MBIT
R34
10K
R33
R31
R44
R28
R29
R13
R45
R49
R14
100
R26
C11
100nF
C17
C14
SYSTEM CLOCK BLOCK
X1
14.7456MHZ
R18
200
C13
22pF
C8
RESET BLOCK
R16
6.8K
R22
D14
R17
100K
U2:B
LM393D
R15
C9
1uF
C12
VREF=3.4V
POWER FAIL
VDRV
R7
470
ZD1
3.3V
D11
R8
C7
C4
R11
15K
C5
U2:A
R12
C6
D12
VREF= 3.3V
INT0_PFAIL
PFAIL_RETURN
Shin Heung Precision Co., Ltd.
Size A3
TITLE : ER-180T
CPU&KEY(MODE)&RST&PFAIL
Rev 1.0
Date 2010.01.28
Drawn by H.T JANG
File Name ER-180T MAIN.SCH
Sheet 1 of 3


PGM & DATA MEMORY
U5
BS62LV1006
(0xC0000 ~ 0xDFFFF)
[DATA SRAM 1Mbit]
MEM_CE
R41 10K
VBAT
R42 10K
Q24 MMBT2222A
R40 4.7K
R37 10K
R36 1K
D17 BAT43WS
C19 100nF
PGM DOWNLOAD
CON-BOX;5P,2MM,ST
VDD50V
CN10:A
CN10:B
CN10:C
CN10:D
CN10:E
RXD1
TXD1
FDT_D/N
R27 10K
R25 4.7K
Q21 KSA1182-Y
CNVSS_HIGH
PFAIL_RETURN
BAT43WS D15
BUZZER
VDRV
D16 M4
R38 200
R39 200
R35 4.7K
Q23 MMBT2222A
AU1 BUZZER
RTC
C16 100nF
X2 32.768KHZ
C15 15pF
U4 PCF8563TS
OSCI OSCO INT VSS VDD CLKO SCL SDA
R32 4.7K
R30 4.7K
I2C_SCLK
I2C_SDA
BACKUP BAT
D20 BAT43WS
D21 BAT43WS
R47 470
BAT_CHARGE
D19 BAT43WS
NOPOP
R51 1K
ZD2 3.3V NO POP
R56 100
D22 BAT43WS
R52 10K
ADC_LOWBAT
BAT1 MS920S-FL27E 3.0V
3.4V
VDD5.0V
U1 (SOT-223) SE1117-5.0V
IN OUT ADJ
C2 100nF
CE3 100uF 16V
R4 1K
R3 1K
ADAPTER & CIGAR
CON-BOX;2P,2.5MM,ST(YH)
GND CN1:1
POW CN1:2
FU1 250V T3.15A
CON-BOX;3P,2.5MM,ST(YH)
CN6:1
CN6:2
CN6:3
CIGAR JACK JOINT B'D
C3 100nF
CE1 2200uF 10V
R6 2K
R5 2K
DRAWER
D1 M4
Q2 MMBT2222A
R2 4.7K
Q1 SL1002
CE2 470uF 16V NO POP
DRAWER SOLE CONN.
CON-BOX;3P,2.5MM,ST
CN3:A
CN3:B
CN3:C
R1 10K
SEN_DWRCOMP
C1 100nF
DRAWER COMP CONN.
CON-BOX;2P,2.5MM,ST
CN4:A
CN4:B
SPOOL - [OPTION]
R23 4.7K
R20 1K
R21 1K
R19 1K
R24 4.7K
Q22 MMBT2222A
D13 M4
C10 100pF
Q20 KSA1182-Y
Q19 KSA1182-Y
CN9:A
CN9:B
CN9:C
MOTOR
SPOOL_MOT
Shin Heung Precision Co., Ltd.
Size A3
TITLE : ER-180T SRAM/PGM DOWN/BAT/DRW /RTC/BUZ/SPOOL/POWER
Rev 1.0
Date 2010.01.28
Drawn by H.T JANG
File Name ER-180T MAIN.SCH
Sheet 2 of 3


FND SEGMENT CONTROL
FND DIGIT CONTROL
DISPLAY INTERFACE CONN.
CON-FPC;16P,1MM,ST,FCZ100E
PRINTER CONTROL(Thermal-LTPZ225B)
PRINTER I/F CONN.(Thermal-LTPZ225B)
CON-FPC;24P,1MM,ST,FCZ100E
FFC CABLE
(TOP CONTACT)
PRINTER
LTPZ225B(SII) 4-DOT
MAIN B'D 24P
Shin Heung Precision Co., Ltd.
Size A3
TITLE : ER-180T
DISPLAY(FND) & PRINTER
Rev 1.0
Date 2010.01.28
Drawn by H.T JANG
File Name ER-180T MAIN.SCH
Sheet 3 of 3


COMMON-ANODE TYPE
DIG
A B C D E F G DP
U1
U2
DIG1 DIG2 DIG3 DIG4
VFD_GRD#1 VFD_GRD#2 VFD_GRD#3 VFD_GRD#4
VFD_GRD#5 VFD_GRD#6 VFD_GRD#7 VFD_GRD#8
FRONT DISPLAY (7 SEGMENT)
1 16
1 16
CN1:B 2 VFD_GRD#3
CN1:D 4 VFD_GRD#2
CN1:F 6 VFD_GRD#1
CN1:H 8 VFD_GRD#5
CN1:J 10 VFD_GRD#6
CN1:L 12 VFD_GRD#7
CN1:N 14 VFD_GRD#4
CN1:P 16 VFD_GRD#8
CN1:A 1 R2 100 VFD_SEG#1(A)
CN1:C 3 R4 100 VFD_SEG#7(G)
CN1:E 5 R6 100 VFD_SEG#3(C)
CN1:G 7 R1 100 VFD_SEG#2(B)
CN1:I 9 R3 100 VFD_SEG#6(F)
CN1:K 11 R5 100 VFD_SEG#5(E)
CN1:M 13 R7 100 VFD_SEG#4(D)
CN1:O 15 R8 100 VFD_SEG#8(DP)
Shin Heung Precision Co., Ltd.
Size A3
TITLE : ER-180 DISPLAY(DUAL)
Rev REV1.0
Date 2010.01.28
Drawn byH.T JANG
File Name ER180 DISP(FRONT).SCH
Sheet 1 of 1


REAR DISPLAY (7 SEGMENT)
FRONT DISPLAY (7 SEGMENT)
COMMON-ANODE TYPE
DIG
A B C D E F G DP
U1
U2
U3
U4
DIG1 DIG2 DIG3 DIG4
Shin Heung Precision Co., Ltd.
Size A3
TITLE : ER-180 DISPLAY(DUAL)
Rev 1.0
Date 2010.01.28
Drawn by H.T JANG
File Name ER180 DISP(DUAL).SCH
Sheet 1 of 1



Shin Heung Precision Co., Ltd				
Size A3	TITLE : ER-180 CIGA-JACK POWER POWER BLOCK & INTERFACE			Rev 0.3
Date	2010.02.17	Drawn by	K.W CHOI	
File Name	ER-180 CIGAR JACK	Sheet	1 of 1	

UPDATE LOG

Application Date	Page	Part #	Notes (Cause & Solution)	S/Bulletin

Use this page to record any special servicing information such as Service Bulletins or Supplements.
When possible, record changes to Code numbers directly on the actual Parts List.
Always records Service Bulletin numbers and Application Dates on this log to ensure that your data is always as current as possible.

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V1.0

Code No. : JK68-70129B